The
# Electrical Review

VOL. CIX JULY 3, 1931 No. 2797

THE OLDEST ELECTRICAL PAPER. ESTABLISHED 1872

Published every FRIDAY, Price 6d.

THE ELECTRICAL REVIEW, 4, LUDGATE HILL, LONDON, E.C.4.

Telegraphic Address: "AGEEKAY, CENT, LONDON." Code, A B C. Telephone No.: Central 5871 (5 lines).

The "Electrical Review" is the recognised medium of the Electrical Trades and has by far the largest Circulation of any Electrical Industrial Paper in Great Britain.

SUBSCRIPTION RATES, Postage Free: United Kingdom, £1 14s. 8d.; Canada, £1 12s. 6d. Colonial and Foreign, £2 1s. 6d. per annum. Chèques and Postal Orders (on Chief Office, London) to be made payable to E.R. (1930) LTD., and crossed "Lloyds Bank."

For List of Foreign Agents for the ELECTRICAL REVIEW see Advertisement Supplement.

## Contents:


| | PAGE |
|---|---|
| Crossing the Boundary | 1 |
| Confusion and Doubt | 2 |
| Investigate! | 2 |
| Industrial X-rays | 2 |
| The Electrical Outlook | 2 |
| "Fair Trading" | 2 |
| Electricity for Space Heating | 2 |
| The Contractors' Conference *(illus.)* | 3 |
| Switchboard Attendants, by C. Cuthbertson | 8 |
| Electricity and Farming, by C. A. Cameron Brown *(illus.)* | 9 |
| International Discussions | 11 |
| To Capture the Heating Business | 12 |
| Electrical Quotations | 13 |
| Electrical Progress in France *(illus.)* | 14 |
| Dust and Sulphur Removal Plant *(illus.)* | 16 |
| Coal Handling at Great Yarmouth *(illus.)* | 17 |
| Congleton Corporation Supply *(illus.)* | 17 |
| Municipal Transport | 18 |
| New Apparatus and Devices *(illus.)* | 19 |
| Business and Industrial Notes | 21 |
| Electricity Supply | 24 |
| Traction | 26 |
| Telegraph and Telephone | 26 |
| Radio | 26 |
| Contract Information | 27 |
| Forthcoming Events | 27 |
| Notes | 28 |
| Our Personal Column | 30 |
| Financial Section— | |
| New Companies Registered | 31 |
| Returns of Electrical Companies | 31 |
| City Notes | 32 |
| Stocks and Shares | 33 |
| Domestic Appliances in Brazil | 35 |
| The Norwegian Electrical Market | 35 |
| East African Prospects | 36 |
| Electrical Progress in British Malaya | 36 |
| Parliamentary Notes | 37 |
| Legal | 37 |
| West Ham Corporation Bill | 37 |
| Correspondence— | |
| Hire-purchase | 38 |
| All-electric or Oil-electric? | 38 |
| Charges for Industrial Power | 38 |
| Electrical "Density" | 38 |
| Published Specifications | 39 |
| New Work for Contractors | 40 |


# Crossing the Boundary

LEADING men in our industry have been pointing out for many years that local government districts do not necessarily form the most appropriate areas for either the distribution of electricity or for transport. Although municipal boundaries are no longer regarded in principle as sacrosanct in the eyes of those responsible for the administration of public service undertakings, yet in practice—as embodied in legislation—the old idea is taking a long time to die.

It was not until 1909 that procedure by "Fringe Order" was introduced—somewhat grudgingly, since supply could be given only to premises specified in the Order. At the same time the impracticability of compelling a railway company to buy electricity for traction from each undertaking through whose territory it happened to run was discounted by the provision that electricity for that purpose might be supplied by any one of the undertakings. In the 1926 Act recognition was given to the fact that electric railways might be very large power consumers, and the permission accorded undertakings to supply electricity for traction outside their areas was extended to the supply of electricity for other purposes.

A long step forward has now been taken by the Select Committee of the House of Lords in its approval of a clause in the West Ham Corporation Bill, 1931, in virtue of which that undertaking will be able to extend its present supply of electricity to the London and North Eastern Railway Company into the area of several other undertakings for any purpose except traction. The exclusion of traction under this clause is important, as it makes the railway equivalent to an ordinary industrial power consumer which is allowed to consume 70 per cent. of the total energy taken outside the area of the undertaking giving the supply.

The implications of this decision are wider than the local considerations involved. The more immediate results will be that a railway power station can be closed down, a heavy expenditure in bringing it up to date can be avoided, and electricity will be available to the railway from a selected station at a lower cost than would be possible if it had been generated at a re-equipped private station.

Had preference been given to the rights of the eleven individual undertakers and the supply been "chopped up" among them, the cost of electricity to the railway would have been about twice that to be charged, and, of course, the company would have had no option but to continue to generate for its own requirements. The other undertakings whose rights have been interfered with are no worse off, since they could not have secured any of the load.

The Committee in deciding in favour of the Corporation, whose undertaking is more favourably situated with regard to transmission than that of the four companies offering competitive quotations, was quite evidently influenced by the desire to ensure the cheapest supply of electricity to the consumer. That a change in legislative outlook is denoted by the passing of the enabling clause is obvious from the contentions of

opposing counsel. It was said that the proposal was revolutionary, that there was no precedent for it, that this was the first time such an application had been made to Parliament, and finally that it cut across the fundamental principle underlying all public legislation by which every electricity undertaking was governed.

If the departure is as revolutionary as counsel have suggested, few will complain. No doubt it will form a precedent by which the undertakings that entered a formal opposition will themselves benefit in the long run.

---

**Confusion and Doubt**

MUCH confusion exists in the manufacturing and contracting sections of the industry with regard to the I.E.E. Regulations and the B.E.S.A. standard specifications governing the production of such small accessories as switches, fuses and plugs, and particularly combinations of these articles. Often manufacturers find that the accessory they can produce best to comply with the main requirement, *i.e.*, the operation test imposed, falls short in the constructional requirements of the I.E.E. Regulations. An increasingly wide variety of plugs, &c., is on the market, all of which are claimed to meet the appropriate B.E.S.A. specifications, and the question is asked—can they all be really standard models? With such confusion and doubt there is a risk both of the value of the regulations and specifications being decreased, and of their abuse. There should be as little as possible control of design by the Institution, while any means to remove doubt as to the authenticity of the Standards Association mark would greatly support the work of the Association and be of much value to the industry generally.

---

**Investigate!**

ON Sunday evening a broadcast report stated that the Dutch Section of the Paris Colonial Exhibition had been completely destroyed, the loss being £500,000 and the cause fusion of electric wires. On Monday morning a generally trustworthy London newspaper reduced the loss to £120,000, but stated that the fire, which was "believed to have been caused by a short circuit," broke out in a small room containing an electrical switchboard. In view of many experiences, we declare ourselves unsatisfied. We hope that the most thorough technical investigation will be made by the French and Dutch electrical authorities. Possibly our Electrical Development Association, which has corrected inaccurate reports of the kind in the past, may find an opportunity to repeat its good work in the present case! In any event let us know the truth!

---

**Industrial X-rays**

THE announcement that American industry "is about to" borrow a leaf from the notebook of the surgeon and use X-rays for the diagnosis of the ills of machinery recalls what has been done in England in this direction. The success achieved at the Royal Arsenal, Woolwich, in the utilisation of X-rays as a shop tool of inspection to reveal concealed imperfections should be too well known by now to need any introduction, while the investigations of the National Physical Laboratory merit really careful attention. This work is, of course, being carried out for a special committee of H.M. Department of Scientific and Industrial Research and has resulted in the development of several improvements in technique of material benefit to the electrical and other industries, X-ray crystal analysis being a particularly useful method of studying many problems. By bombarding a solid with a fine pencil of X-rays of suitable wavelength it is possible to obtain on a photographic plate a pattern which, in its regularity, reflects the regularity of the arrangement of the atoms in the minute crystals of which solid substances are in general built up. Each different chemical combination of atoms gives its own characteristic X-ray pattern, so that this method of analysis can be used as an auxiliary to the standard methods of chemical analysis; also, since many of the properties of a solid depend upon the nature of arrangement of the constituent crystals, the method has many possible applications to industrial research. It readily distinguishes, for example, between mixtures and solid solutions; it indicates the nature of the structural changes which occur when a substance is heat-treated, treated chemically, or modified physically. In short, it is a non-destructive tool of examination which requires a small amount only of the material being studied to be subjected to the test.

---

**The Electrical Outlook**

"WHATEVER happens, we electrical people have no reason to be downhearted. . . . Our field for a generation or two is inexhaustible." These are not the soothing phrases of an evening newspaper scribe; they are the convictions of a very hard-headed company chairman with lengthy manufacturing and trading experience, namely, Sir Hugo Hirst, Bart. Those who are at the heart of the industry and know it best, will be in complete agreement with him. The words are extracted from his speech delivered on Tuesday to shareholders of the General Electric Company, Limited. That company did not have quite so good a year last year as in 1929; net profit fell by 4½ per cent., but the number of transactions was larger, the average value falling—a sign of the times! Characteristically, however, the period of world depression has been used for launching out financially to secure new supply fields for exploitation; and in further technical research; while representatives have been sent to open up trading connections in new overseas markets. Railway electrification naturally colours every British electrical manufacturer's outlook just now. We have an industry that cannot stand still, but we must all and always be ready to adapt ourselves to new needs and to changing situations. Providing that we do this we can join Sir Hugo in visualising a position that will enable us "to challenge the world again for industrial supremacy."

---

**"Fair Trading"**

AT last week's annual Conference of the Electrical Contractors' Association, Mr. W. Finlay, a member of Committee "D," whose report is now under consideration by all sections of the industry, claimed that the Committee's "Fair Trading Policy" provided a remedy for all the ills from which the industry suffers. He said that it would bring peace to the industry—a consummation devoutly to be wished. The need for such a policy is most apparent, for "poaching," the indiscriminate granting of discounts, price-cutting and other trade abuses, have reached a serious stage, and all sections are losing a great deal of money which should be kept within the industry to provide reasonable profits and opportunities for expansion. The system to be employed in the rectification of grievances and irregularities appears to involve the setting up of semi-judicial bodies—local and national—to which all such questions will be taken. Mr. Finlay has revealed that the Committee has defined the "trade user" and fixed his discount; that in itself is no mean feat. Until the report is "released" for public information we can say no more, but we hope that it will be available very soon.

---

**Electricity for Space Heating**

CONSIDERED broadly, it is difficult to exaggerate the importance to the electrical industry as a whole, and particularly to the supply section, of the announcement this week of the formation of the new company, Barker, Young & Co., Ltd., as the result of the co-operative efforts of three important space-heating firms to capture the business which is at present going outside the electrical industry. The economy which can be brought about through the flexibility of l.t. electrical heating, with perfect control, outclasses all non-electrical systems. That is becoming recognised, but there is the stumbling block—radiant *versus* convected heat. In very many cases the ideal is a combination of the two systems, *again*, with perfect control. We cannot claim to have tackled adequately domestic electrification until the long-period heating load, by far the most important, is brought in.

# The Contractors' Conference

## An Account of the Proceedings at Eastbourne

DELEGATES arriving at Eastbourne on Wednesday last week for the sixth annual conference of the Electrical Contractors' Association and its allied organisations were greeted by sullen skies. A repetition of the rather damp conference at Scarborough in 1927 was feared, but the rain held off and by Thursday evening the weather was quite brilliant.

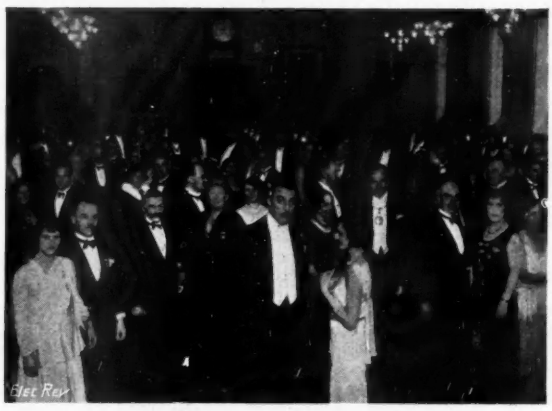
Many familiar faces were seen at the President's reception on Wednesday evening, and the dance was evidently enjoyed. It is sufficient testimony to the success and enjoyability of these conferences that year by year the same people attend them. The opportunities of meeting friends and competitors are all too rare, and full advantage is taken of this annual event.

Many of those who had attended the previous week's I.M.E.A. Convention were to be seen. These functions are strenuous affairs; there must be such a thing as a "conference constitution."

### Civic Welcome

After the annual meeting on Thursday morning, the Mayor of Eastbourne (Lt.-Col. Roland V. Gwynne, D.S.O.) came to the Town Hall to extend a very warm welcome to the four hundred or so delegates and visitors. In the course of his address, His Worship spoke of the apprehensions of Eastbourne with regard to the amenities of the neighbourhood under the Central Electricity Board's schemes. He said that he realised that Parliament had determined to make electricity available to every town and hamlet in the country at any cost. It was the contractors' duty to insist on a cheap electricity supply and also to provide installations at a reasonable price.

In thanking the Mayor, the PRESIDENT (Mr. H. C. Hazel) referred to the broadminded electrical policy of the Eastbourne Corporation. It had made the supply generally available at a low price, and had established very harmonious relations with the local electrical contractors.



Wednesday Evening's Dance

### The Presidential Address

MR. HAZEL then delivered his address, which was summarised in last week's issue. In this he reviewed the progress which had been made by the Association in the last twelve months, and he concluded with the appeal, which we hear so frequently from the presidents of all associations, for greater interest and support from the general body of members. In the case of the E.C.A. this seems to be of greater moment than usual, for the Association represents a large number of businesses all with similar interests which can only be protected by very close association of them all.

### Contractors and the Law

After the luncheon interval the conference was resumed at the Town Hall, Alderman R. TWEEDY-SMITH, the solicitor to the E.C.A., reading his paper on "The Law Relating to Electrical Contractors and Engineers" (see our last issue).

The author adopted the very wise practice of assuming that his paper, which had been circulated to members, had been read, and contented himself with a brief review of the matters dealt with. In the course of this, he expressed the opinion that it was not only essential that contractors should have sufficient acquaintance with the law to keep them out of trouble, but that the lawyers whom they consulted should have some knowledge of the technicalities of the electrical business upon which the equity of a case often depended. He admitted that his remarks regarding the recognition of qualified persons in the electrical industry might be considered a digression, but such a combination as he had suggested would raise the legal status of the contractor and eliminate the incompetent.

Mrs. W. R. Rawlings, Mr. Rawlings (president-elect), Miss Hazel, the President and Miss Robson

The President's Reception

### The Paper Discussed

Upon being asked to open the discussion, MR. W. FINLAY, W.S. (secretary of the E.C.A. of Scotland), suggested that he had been selected for the task on the principle of "setting a thief to catch a thief," but he made it clear that he refused to be drawn into a betrayal of his profession. He maintained that every layman should study the law of the land in so far as it related to his own business. An important feature of electrical law was that the great bulk of it depended upon bureaucratic regulations—not legislation; he thought that this was all to the good, being produced by experts with a knowledge of the technicalities. In this connection he mentioned that he had recently discovered a little-known regulation forbidding a manufacturer to establish a generating plant above a certain size in the area of a supply authority without that authority's permission. He did not think that any reputable insurance company would refuse to pay out after a fire until the contractor had been sued and made bankrupt. The author had given a good deal of valuable gratuitous advice, but before acting upon it they should get it confirmed, paying the appropriate fee.

MR. C. C. PATERSON, O.B.E. (President of the I.E.E.), speaking as a director of research, referred to the "legal empiricism that lie in wait to ensnare the unwary." He thought that it was very difficult to establish broad principles in law, but considered that the law endeavoured to protect the innocent—in which class, of course, the electrical contractor was to be found. He concluded by extending the Institution's cordial greetings to the E.C.A.

The Mayor (Lt.-Col. R. V. Gwynne) Welcoming the Visitors

### The Institution and a Code

MR. W. R. RAWLINGS (president-elect) said that it was in 1902 that he and Ald. Tweedy-Smith first considered together the legal protection of the contractor. The paper, unlike the usual legal document, was easy of comprehension. All contractors suffered from interference by employers and even if the consequences were pointed out to them, and they persisted

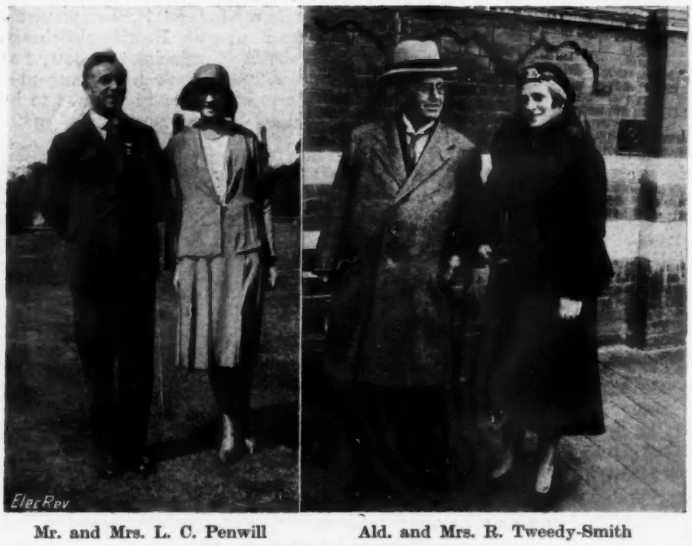
**Listening to the Presidential Address**

in having unsafe work carried out, the contractor might fall foul of his professional association. With regard to payment on account, he asked if it were sufficient to use a printed heading upon tenders stipulating this. Was the contractor liable after the completion of a job if the contract said nothing regarding maintenance? The E.C.A. would gladly join with the I.E.E. to secure a legally compulsory national wiring code.

MR. W. LANG (London) advised members to confer and try to arrive at a compromise before rushing into law. Often it was better and cheaper to submit to injustices than go to the courts. He believed that no equity existed in a contract providing for penalties in the event of late completion unless, at the same time, it provided for the contractor to be rewarded for completing the work earlier. He had noticed that Mr. Paterson had steered clear of the author's suggestion regarding combination. He did not think that the Institution could possibly support any scheme of that kind—its objects lay in an entirely different direction.

MR. H. MARRYAT (past-president), after relating how he had once " pulled the author's leg " by running a legal column in the Associations' journal and putting up alleged questions from members for his solution, expressed the opinion that interference by employers was often a godsend to contractors. He had benefited from the advice given to him by the author years ago that whenever anything likely to lead to trouble arose matters should be put into writing.

MR. H. F. TRUMAN (Walsall) said he had thought that British justice would not hold a contractor liable for damage done by flood and fire, over which he had no control; and that the Association's standard form of contract covered the whole of his liabilities.



Mr. and Mrs. L. C. Penwill Ald. and Mrs. R. Tweedy-Smith

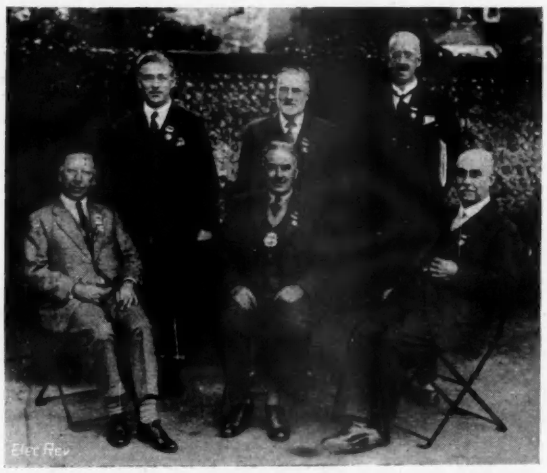
**The Authors and their Ladies**

### Financial Stability of Employers

MR. L. C. PENWILL (general secretary) said that he had often been asked whether the contractor could claim for expense caused by delays due to employers, architects, or consultants. Was it true that he could not do this, and, if so, could it not be remedied? There were now many speculative builders acting as main contractors, and bankruptcies were common. Electrical contractors, before acting as sub-contractors, should therefore assure themselves of the financial stability of concerns with which they were thus associated. The speaker quoted two recent legal decisions in support of his warning.

MR. H. WILLOUGHBY ELLIS (past-president) related an early experience of his own as an example of the liabilities which contractors undertook when they gave advice. It was totally impossible for a contractor to give advice to all kinds of manufacturers unless he had a complete knowledge of the processes involved in each and every industry. And yet he would be held liable if the plant installed on his advice proved unsatisfactory.

Messrs. G. E. HERVEY (Eastbourne) and W. H. H. HYDE (Hull) put questions to the author, the latter asking



Standing: Mr. L. C. Penwill (general secretary), Mr. W. B. Williams (vice-president-elect) and Mr. R. W. Kennedy (editor). Seated: Mr. H. Willoughby Ellis (immediate past-president), Mr. Hazel (president) and Mr. Rawlings (president-elect.)

**An Official Group**

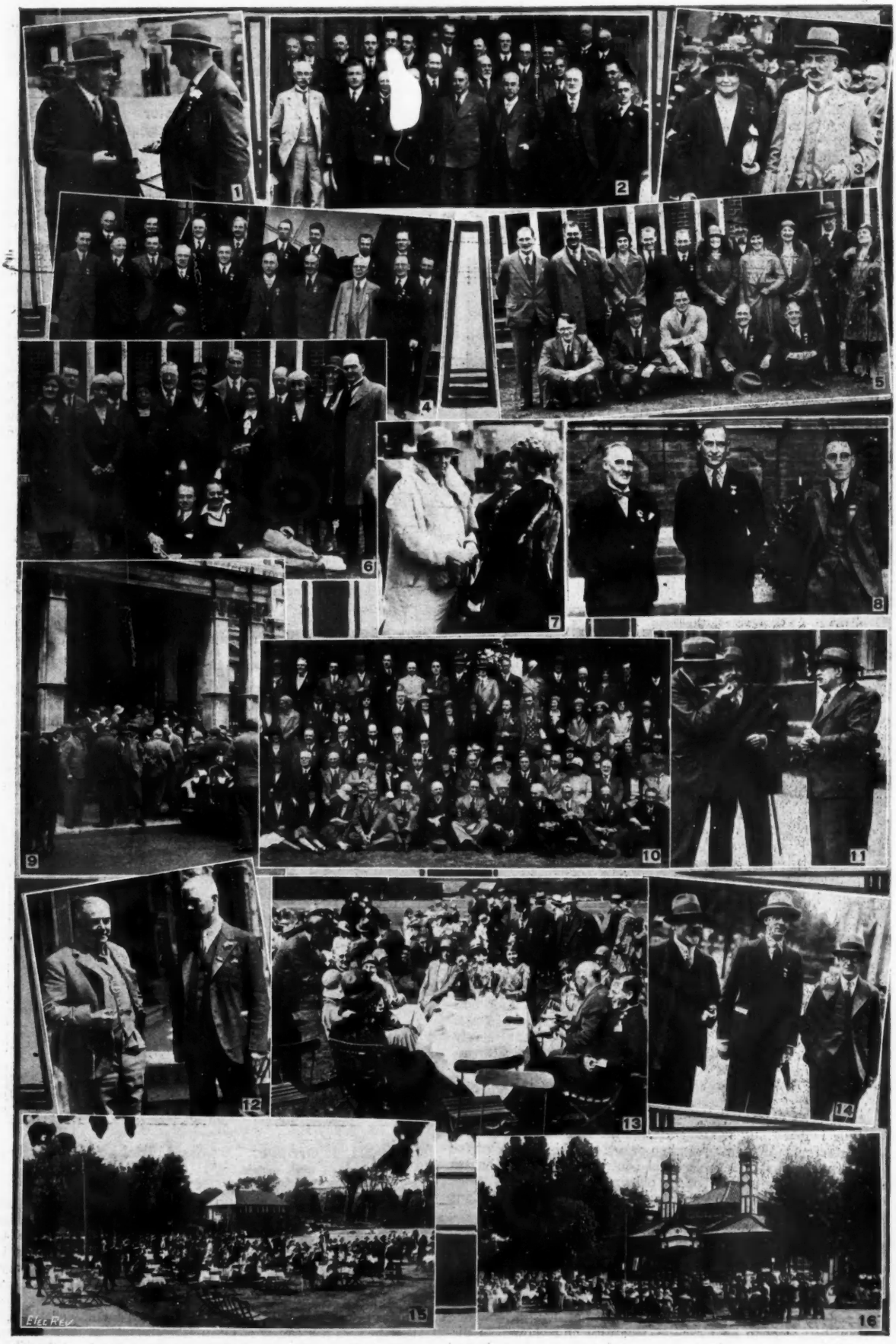
whether it was legal for an authority to insist on a clause stipulating that work should be carried out to its " satisfaction." In somewhat the same connection, Mr. A. J. LAMBERT (Bath) asked who was to decide whether things omitted from a contract were necessary.

### The Author's Reply

In reply to the discussion, ALDERMAN TWEEDY-SMITH quoted a case in which a contractor was found liable for a whole building which was destroyed by fire through an accident caused by a boy sent to replace a fuse. He advised members to consult the head office when considering insurance matters. He asked if Mr. Paterson could not " protect the innocent " by assisting the Association to secure legal recognition for the contractor, and requested the organisations concerned to give this matter their earnest consideration. Mr. Rawlings's suggestion regarding a printed heading for quotations seemed to be a good one. If a contract contained no maintenance clause, but it was obvious that certain things might happen when the work had been completed, then the contractor was liable; otherwise there could be no claim. He reminded the members that when the law of bankruptcy stepped in, the whole aspect was considerably altered.

### An Unfortunate Incident

Thursday's proceedings were marred by a serious accident in which the President of the I.E.E. and Mrs. Paterson and Mr. H. B. Atkinson were involved. Mr. Paterson had driven to the station to meet Mr. Atkinson upon his arrival. On approaching a turning the chauffeur was forced to swerve to avoid another car and struck a tree. The party was



(1) Mr. H. Beney (local Conference Secretary) and Mr. J. Snow Huddleston. (2) The Council. (3) Mr. and Mrs. H. Marryat. (4) The Local Committee and Council members. (5) A Sheffield group. (6) Members of the Western Section. (7) Mrs. Ll. B. Atkinson, Miss N. Miller (Ediswan) and Miss C. Haslett. (8) Messrs. R. Robson, F. W. Harrison and W. O. Honor. (9) At the Town Hall. (10) Posing for the official photograph. (11) Messrs. J. Snow Huddleston, W. Riggs and W. H. Walton. (12) The President and Mr. J. K. Brydges. (13) Tea at the Garden Party. (14) Messrs. W. Riggs, A. G. Bruty and T. E. Alger. (15) and (16) The Garden Party at Devonshire Park. *The Council Group* (2) *is as follows* :—Back row (left to right): Messrs. R. Harrison-Watson, W. H. Walton, W. Riggs, E. Kidd, W. H. H. Hyde, A. G. Bruty, T. E. Alger, F. Madge, J. D. Green, J. H. Edwards, C. B. Taylor, J. Orringe, R. W. Kennedy and H. E. Walker. Front row: Messrs. H. Marryat, L. C. Penwill, F. W. Cook, H. Willoughby Ellis, H. Moss, H. C. Hazel (President), P. J. Whiting, W. R. Rawlings (President-elect), F. J. Hawkins, W. B. Williams (Vice-President elect), N. Aish and P. Hewitt. D

thrown out of the car. Mr. Paterson sustained a very severe shock while Mrs. Paterson and Mr. Atkinson were badly cut by broken glass, necessitating their detention in a nursing home. The chauffeur was rather seriously injured. Mr. Paterson was able to leave the nursing home on the following day and our latest information is that Mr. Atkinson hopes to return to town in a few days' time and that Mrs. Paterson is progressing favourably.

### Smoking Concert

For this year's smoking concert—a regular feature of the second day of the Conference—the Association was fortunate enough to secure the Floral Hall at Devonshire Park, complete with an excellent concert party which was performing there last week. It was apparent that everybody enjoyed the

Messrs. J. Hill, J. H. Farthing, T. P. Shillcock, H. Mountford, E. A. Harvey, A. Shelton and Holmes.

### Discussing Fair Trading

show almost as much as the subsequent dance. The latter, in accordance with established custom, continued well into Friday morning. This, of course, accounted for the delay in commencing business later in the morning—a delay which was, however, caught up by the judicious handling of the proceedings by the President.

### "Fair Trading"

MR. L. C. PENWILL, the general secretary, read his paper on "Fair Trading Within the Electrical Industry" in abstract. Manufacturers' representatives turned up in force for the session, and the Electrical Wholesalers' Federation was represented by its president, Mr. Albrecht, and vice-president, Councillor G. H. White. In the discussion, therefore, the views of the other sections of the industry were presented, although perhaps the speakers were somewhat restricted by their position as guests of the contractor. Mr. Albrecht, it is true, put the wholesalers' case rather forcibly, but for the rest the discussion consisted mainly of confirmation or amplification of points in the paper.

### Discussion on Mr. Penwill's Paper

The new vice-president of the E.C.A., MR. W. B. WILLIAMS (Bristol) opened the discussion by stating that mutual trust and co-operation in the industry had certainly made progress, but there still remained a great deal to be done. Price cutters were determined to get contracts—whether profitable or not. They did not mean to do harm, but they injured their fellows. Too many members of the Association were content merely to pay their subscriptions and do nothing in the way of service. The paper should be circulated to all branches for their consideration, and a report should be presented by the president at the next conference.

MR. H. T. YOUNG (Troughton & Young, Ltd.) said that difficulties in obtaining lighting fittings forced him to become a manufacturer. Decorators, when renovating houses, called for new fittings, but when electrical contractors re-wired houses they were content to restore the old fixtures. Thus the fittings business was getting into wrong hands. The plain pendant should be superseded by good dustproof fittings.

### Quantity and Showroom Discounts

MR. A. SHELTON (Manchester), speaking as a manufacturer, said that in the electrical industry the manufacturer was handicapped because requirements were not anticipated. This hand-to-mouth method could be abolished if the contractor persuaded customers to use certain classes of fittings, enabling quantity orders to be placed. Quantity and showroom discounts were due to the contractor who displayed goods and purchased in large numbers.

MR. A. W. MAKOVSKI said that it was not the people who attended those conferences who were responsible for price-cutting, but outsiders. In the motor trade thorough organisation had got over the difficulty, and an example had been set for the E.C.A. to follow. The contractors must convince the manufacturer that it was cheaper for him to sell through the trade than to go direct to the public. After stating that too many friends of people in the manufacturing industry were getting trade discounts, he concluded by emphasising that the smaller men must be got into the Association.

### Discord in Leicester

MR. J. ORRINGE (past-president) thought that contractors were now receiving greater recognition from the manufacturer and wholesaler than they received a few years ago. By dealing with the contractor the public obtained service which no one else could give them. Contractors should not merely be interested in the sale of appliances, but also in what happened to them afterwards. Selling charges were high, and the withholding of discounts from the general public would enable contractors to be properly compensated. In his own town of Leicester the closest co-operation existed between local contractors. In combination they had opened excellent showrooms, and did a great deal of development work. In spite of this the Electricity Committee proposed to carry on an assisted-wiring scheme, necessitating the employment of 200 men, by direct labour. The municipality could not possibly do the work so cheaply or efficiently as the contractors, who were mainly responsible for the success of the electricity undertaking. He considered that this was a case in which the manufacturers might take action, and that E.D.A. should use its influence to discourage this tendency.

MR. G. F. RATCLIFFE (Great Missenden) suggested that manufacturers should let contractors have appliances at cost price for display and demonstration purposes. This would encourage the keeping of adequate stocks.

MR. T. C. GILBERT (Folkestone) drew attention to the way in which the prices of certain appliances were loaded up by commissions and selling costs. Making particular reference to an American vacuum cleaner, he said that the makers' selling policy was a sound one. For every machine sold in his area the authorised dealer received discount, whether he had helped to sell the machine or not. Which did the contractor prefer—this policy which sometimes involved unearned discount, or the policy of some British manufacturers of granting discounts to anybody?

### Harmony in Eastbourne

MR. J. K. BRYDGES, borough electrical engineer of Eastbourne, said that he regretted the action taken by the Leicester Electricity Committee, for in Eastbourne he had found that co-operation with the contractors had produced gratifying results. The local contractors brought their customers to the municipal showroom (which was one of the finest in the south) and received the whole of the discount on sales, with the ex-

**Mr. J. Orringe,** who dealt with unfair trading at Leicester

**Miss J. Dicks (Winchester)** The only lady member of the E.C.A.

ception of a small proportion which the undertaking retained for expenses. They, however, retained the right to purchase goods from manufacturers on factors' terms, for re-sale to the contractors. Eastbourne was one of the first towns to institute an assisted wiring scheme, and the work had always been done by the contractors. Supply authorities had quite enough to do without undertaking installation work.

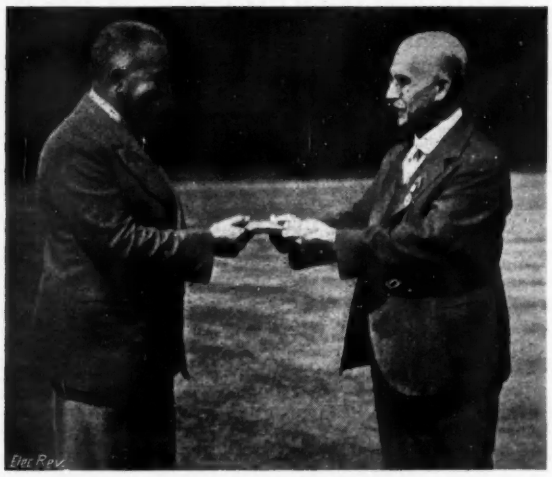
MR. C. W. SULLY (director of E.L.M.A.) mentioned the fact that he was a member of Committee "D," but as that Committee's "Fair Trading Policy" was at present *sub judice* he must forbear to comment on it. He thought that contractors were not "over-anxious" to serve the public, but impatient to get the work before someone else did. They would be better able to serve the public if fair trading conditions existed. E.L.M.A. was one of the associations which had set an example in the matter of a fair trading policy. He feared

that not until the millenium arrived would manufacturers cease to canvass clients among the public.

MR. F. W. COOK (Southampton) deprecated Mr. Penwill's proposal that trade discounts should be reduced; they found it hard enough to make a profit from the present discount, owing to the burden of overhead charges.

### The Wholesaler's and Manufacturer's Views

MR. A. ALBRECHT (president, E.W.F.) considered that Mr. Penwill spoke as a statesman in some parts of his paper and as a politician in others. The contractors' problem arose mainly from his dual personality—as installer and seller. He did the wiring so well that the manufacturer and wholesaler could not interfere. On the selling side all that the contractor



**Mr. Rawlings Presents a Gold Cigarette Case to the Retiring President**

asked was that the manufacturer and wholesaler should set the stage and enable him to do a very fine business. The manufacturer and wholesaler did not set out to do the contractor out of the business, but selling to-day was a very serious matter. The author spoke like a statesman when he said that contractors must possess the ability to demonstrate and sell. When the contractors seriously attempted to carry out that policy, the first to come to their aid would be the manufacturer and wholesaler.

MR. H. A. LINGARD (British Thomson-Houston Co., Ltd.) agreed with Mr. Cook that the cost of distribution was so high that discounts could not be reduced. If the contractors set up a really live trading organisation little would be heard of "Fair Trading Policy."

Councillor G. H. WHITE (vice-president of the E.W.F.) said that the Manchester Electricity Committee, of which he was a member, had resolutely avoided municipal trading. He had no doubt that the three sections of the industry would get over their difficulties, but municipal competition was a different matter. Municipalities just "estimated" and the consumer had to pay the cost, whereas a contractor was tied to his quotation.

### Committee "D"

MR. W. FINLAY said that they would find that the agreement drawn up by Committee "D" proposed a remedy for every trading difficulty in the industry. It set up a central authority and local bodies to adjudicate upon trading problems; it also defined the trade user and provided for a 10 per cent. difference between his price and that charged to the contractor. He was convinced that the scheme would bring peace in the industry and he paid a tribute to the admirable chairmanship of Mr. F. W. Purse.

### The Author's Reply

MR. PENWILL pointed out the impossibility of replying adequately to all the points raised in the short time available. He maintained that the contractor could not be expected to carry large stocks if he was not adequately rewarded. The Association could never be prepared to cater for the 10,000 people who called themselves contractors. He agreed with Mr. Orringe that the Leicester matter was one with which the whole industry should deal, and he called upon the industry to tackle it in co-operation. He still maintained that if the contractor was enabled to extend his sphere he could do without courtesy discounts. Actually his proposals taken as a whole would not mean a reduction in discounts. He disclaimed any intention to convey the impression gained by Mr. Albrecht; indeed he had had the temerity to point out their defects to his own members.

### The New President

MR. HAZEL then moved a vote of thanks to all who had contributed to the success of the Conference, mentioning particularly the Mayor and Corporation of Eastbourne, the local committee (under Mr. H. Beney's chairmanship), and the general secretary and his staff.

He then introduced his successor, Mr. W. R. Rawlings, although, as he said, Mr. Rawlings needed no introduction, having been active in the Association's affairs since its inception 30 years ago. He had been president of the old National Association, the first president of the Incorporated Association, and president again in 1914-15. Mr. Hazel described the new president as "a doughty champion of the past and an alert and vigorous worker of to-day."

### The New President's Remarks

MR. RAWLINGS said that astounding electrical progress had been made during his somewhat lengthy recollection. There never had been a time when electrical possibilities were greater or more encouraging than they were at the moment.

Before his term of office came to an end he hoped to gather together some of his electrical experiences and recollections over the past forty odd years, but he had already discovered that it was not easy to give a really comprehensive and strictly comparable picture of the progress made in the past 20 years.

The British Commercial Gas Association recently claimed that, whereas in 1912 the annual consumption of gas in the British Isles amounted to 210,000 million cu. ft., in 1930 the consumption had risen to 330,000 millions, showing an increase of one-third. *Garcke's Manual* showed, however, that the sale of electricity had risen from 1,100 million kWh in 1912 to about 9,000 million kWh in 1930, an increase of more than eight times during the same period. He found that the electrical progress in his own home district of Wimbledon and also in the town of Eastbourne corresponded very fairly with the main figures already given. There were many reasons why electricity supply was making such wonderful progress, but he was certain that the action of the gas companies in taking over all gas installation work, and wiping out the gas-fitter as an independent private tradesman, was very largely responsible for their low rate of progress. On the other hand, the rapid development of electricity supply was undoubtedly due to the large body of electrical contractors canvassing continuously on behalf of their own businesses—and therefore on behalf of electricity supply—all over the country. Many

**Mr. Hazel felicitates Mr. Willoughby Ellis on his Birthday**

important supply engineers had publicly stated that the increased load was due to the individual efforts of the contractors. It was therefore not surprising that the Association was supported and consulted by Government Departments, the Institution of Electrical Engineers, and by the principal supply engineers, since they knew that the Association stood for real electrical progress and sought to foster a standard of work and trade integrity second to none.

### Garden Party and Ball

Brilliant weather prevailed throughout Friday, and this ensured success for the afternoon garden party at Devonshire Park, some pictures of which appear on p. 5.

In the evening the Mayor's ball and supper, also at Devonshire Park, attracted a very large throng, and formed a very pleasant conclusion to a most pleasurable Conference.

# Switchboard Attendants. By C. Cuthbertson, A.M.I.E.E.

## How conclusions may be formed as to the suitability of a candidate

ARTICLES have from time to time appeared in the technical journals relating in an entertaining manner personal recollections of switchboard attendants. Yet to the serious student endeavouring to understand just what is the position of switchboard attendants in the organisation of technical staffs in the electricity supply industry, such articles—diverting as they may be—are of little use, and may indeed convey an erroneous impression of the habits and capacity of the kind of man who operates the costly, complex, and extensive switchboards which are so vital a part of the scheme of electricity supply.

A very good thumbnail sketch of the rôle of switchboard attendant was given in an article published recently in the Press entitled "The Switchboard Keeper." This article attracted the notice of Mr. F. W. Purse, M.I.E.E., the chief engineer of one of our largest supply authorities, and at a public function shortly afterwards he paid a high tribute to the good service rendered by the switchboard attendant and spoke at some length of the vital importance of this work.

It has been asked in the "Correspondence" columns of the ELECTRICAL REVIEW whether a position as switchboard attendant may rightly be regarded as a stepping-stone to a higher post. While awaiting the answer to this difficult question, a junior engineer should consider the matter from his own individual standpoint and endeavour to decide as to his own suitability for this kind of work.

Taking for granted that some men are naturally fitted for the work and that others are not, it would seem that a twofold benefit should result from a clear understanding as to the natural aptitudes desirable in a switchboard attendant. First, prospective entrants into such work could judge of their suitability for it, and its suitability for them, and, secondly, the engineer responsible for selecting new junior attendants, or re-distributing the old ones, could have at hand a better method than dependence upon that elusive, indefinable "instinct" which those who have done much selecting are the first to admit has often "let them down." Undoubtedly, the size and the importance of existing electrical switchboards to-day more than warrant some degree of standardisation in the methods employed for the selection of suitable trainees for the work.

It must be emphasised that to select the best man for a certain position calls for some analysis of the requirements of the work. Stations themselves, their electrical equipments and their *personnel*, differ widely in themselves, but the common features of the occupation of switchboard attendant are represented by the following classes of work:—

1. The operation of numerous and complicated apparatus for paralleling, regulating voltage, &c., under normal and under emergency conditions.
2. The reading and logging of a large number of meters.
3. The maintenance of electrical equipment.

The satisfactory carrying out of these duties involves the exercise of certain natural aptitudes, *e.g.*:—

(*a*) Ability to learn and remember in proper sequence a number of complex sets of switching operations.
(*b*) Ability to utilise knowledge of power station and sub-station practice in emergency switching and isolating.
(*c*) Ability to comprehend readily and follow with accuracy the instructions received either verbally or in writing—without misunderstandings.
(*d*) Ability to persevere with a problem until it is solved, or until there is satisfactory reason for believing that it is not solvable by the means available.
(*e*) Ability in solving a new problem, *e.g.*, in locating and remedying trouble.
(*f*) Ability to give attention to several different operations or things at the same time.
(*g*) Ability to keep attention on a group of switches, meters, &c., comprising a certain specified circuit.
(*h*) Ability to carry in mind an image of wiring arrangements, &c., and the position of equipment in a distant power station or sub-station.
(*j*) Ability to locate on a diagram the beginning and end of a circuit with accuracy and speed.
(*l*) Ability to state what has been seen, and to keep the facts separate from his conjectures.
(*m*) Ability to make a pencil sketch of a simple object, and convey by telephone the appearance and dimensions of the object.

The relative importance of a certain aptitude in a particular instance is obviously dependent on local conditions, and can be readily assessed by an experienced superintendent.

With a list of the qualities required for the proper performance of the work, the selection of the right man for a particular position becomes feasible.

The performance of short-listed candidates can be classed as good, average, or poor by simple tests which the superintendent will readily devise. It will be seen, then, for some of the items a test by pencil and paper will suffice, and that items (*f*) and (*g*) will be best executed by actual operations on a switch panel made dead for the purpose; while item (*b*), being an emergency operation, requires the observance of the candidate's responses to one or two briefly-recited sets of typical emergency conditions.

While some superintendents doubtless have developed the art of interviewing candidates, there is a marked absence of published information on the subject, and, moreover, there are many indications that a better technique is needed. It is sometimes forgotten that in choosing attendants the aim should be to select only those whose natural ability will facilitate their acquirement of a high degree of skill without more than a brief period of training after appointment.

While strongly advocating the training of staff members after appointment, the author regards it as in no sense a substitute for a proper scheme for the selection of the best trainees before appointment.

Juniors must be taught, helped, and encouraged, but this teaching is a long and trying job. In many works it is non-existent; in others, where it is part of the programme, it may become inoperative, particularly if it devolves on already-overloaded superior officers, who are at the same time responsible for the maintenance of discipline. Moreover, it is not always productive of commensurate results, modern youth having little liking for instruction, except as the immediate means to obtaining a post.

Obviously some concerns may be too small to benefit by the idea, but the present development of the large undertaking offers an excellent opportunity for its application, and a scheme such as that outlined may be expected to improve the efficiency of station (and sub-station) operation by effecting the following economies:—

(1) Reduction in the number and seriousness of avoidable accidents.
(2) Reduction in cost of repairs and renewals.
(3) Reduction in labour turnover.
(4) Reduction in the initial probationary period of newly-appointed men.

It is common knowledge that similar methods of selection are successfully used in other public services, including the telephones (for operators) and transport (for drivers), and the general adoption of methods of selection based strictly on the ascertained aptitudes of the candidates would be undoubtedly beneficial in the electricity supply industry also.

### Institute of the Plastics Industry

This newly formed Institute, the objects of which are to create a better spirit amongst members and to enable them to educate one another by means of periodical lectures in the subject they are trying to elucidate, recently commenced its proceedings appropriately with an evening lecture on synthetic resins, their raw materials so to speak. Mr. A. T. Ward, assisted by Mr. A. E. Smith, of the B.T.-H. Co., dealt with the constituent substances, process plant, variation of properties and characteristics according to methods of manufacture, and the consequent precautions to be observed. The lecture was illustrated with lantern slides and chemical demonstrations and it would seem that considerable further investigations will be needed to clarify all the reactions involved. Pigments and "fillers" require to be very carefully dried when good electrical insulating properties are desired, but attempts to improve resistance to electric-arc "tracking" do not appear to have been conspicuously successful so far. One synthetic product resembles glass, can be machined readily, and is transparent to ultra-violet rays. The American G.E. Co. and the B.T.-H. Co. have investigated a process of making "Glyptal" without elaborate plant. Samples in delicate colours and transparent slabs were exhibited; also lantern slides showing its application to electrical machine stators in the form of lacquer. The substance is being developed into varnish by Imperial Chemical Industries, Ltd.; it can be machined readily, is suitable for bonding mica sheets together, and can be used advantageously in cases in which the "Bakelite" type of product is not applicable, but it will have to be modified considerably before it can be moulded successfully. The subsequent discussion emphasised the very large variety of substances that can be used for making synthetic resins, which products will play an important part in future. The fact that they are now being made in Russia does not seem to be generally realised. The hon. secretary of the new Institute is Mr. P. G. Rudd, of Ebonestos Insulators, Ltd., 104, High Holborn, London, W.C.1.

# Electricity and Farming. By Chas. A. Cameron Brown, B.Sc., A.M.I.E.E.

## The directions in which there is most scope, now and in the future, towards the mechanisation of farming: power applications: heating the soil: electro-culture

THE most striking advances in mechanisation in the last few years have been those which are leading to the conception of the completely mechanised arable farm on large-scale lines. What, then, are the possible applications of electricity to arable farming in its various branches from the large cereal farm at one end of the scale to the smaller but more intensively cultivated market garden at the other end?

On the mechanised cereal farm power is required mainly for ploughing, cultivating, after-cultivations (such as harrowing, rolling and drilling) and, finally, for harvesting and threshing. In many cases, too, power will be required at some point of the rotation for the various operations of haymaking. The internal-combustion-engined tractor is becoming more and more generally used for all these operations. There is no evidence that the electrical tractor is yet a practical proposition, so that at the moment the application of electrical power to arable farming operations is limited practically to the electrically-driven winding set.

**Mr. Cameron Brown, of the Institute of Agricultural Engineers, University of Oxford, is the author of "Electricity in Agriculture," and read a paper on this subject at the second World Power Conference in Berlin in 1930**

This brings us to the first difficulty in the extended use of electricity, namely, that the winding set cannot be used for either harvesting or haymaking. For these the tractor is indispensable on the mechanised farm, and where the tractor is available it will no doubt be used also for all the after cultivations.

### Cable Ploughing

The use of the cable set in this type of farming is limited, therefore, in practice to ploughing and the heavier cultivations; its most likely field for employment in the future appears, therefore, to be the large well-balanced farm where there is room in the farm economy for both cable sets for the heavier operations and tractors for the remainder of the work. On a farm of this kind, provided the general layout is such that the greater mobility of the tractor is not of paramount importance, it is probable that the electric cable set could compete favourably with petrol or paraffin direct-haulage machines.

With power at 1½d. per kWh, the running costs would be less than those of the tractor. With crude-oil tractors, in which an increasing interest is being taken, the comparison would be less favourable. The maintenance and depreciation charges would in either case favour the electrical set, but even this advantage is annually becoming less important owing to the increasing reliability of the modern tractor. A recent test of a three-year-old tractor showed a performance as good as that of a new machine of the same model. It maintained a 20 per cent. overload for two hours without flagging and with a reasonably good fuel consumption.

### First Cost a Difficulty

Assuming that comparison on these points favoured the electrical set, there is still the question of first cost, which in the present state of farming exerts an unduly great influence on policy. Before electrical ploughing equipment can take any appreciable part in large-scale agriculture, its first cost must be reduced to a more competitive level. In any case, it is likely that any opening will be not so much for the large 100-h.p. sets as for those of from 35 to 40 h.p., like the light S.G.A. illustrated on p. 1084, and the Estrade ploughing set which is shown below.

One other possible application of electricity to the large farm is in crop and grain drying, but it is probable that in general the running costs would make its use prohibitive. Although it is a digression from the subject of the mechanised arable farm, it is worth calling attention here to the work done by the Shropshire, Worcestershire, and Staffordshire Electric Power Co. in drying hops by electricity. This is a high-grade crop which requires particularly fine control in drying. Good results have been obtained with electrical drying, and the whole process shows promise of becoming a practicable proposition.

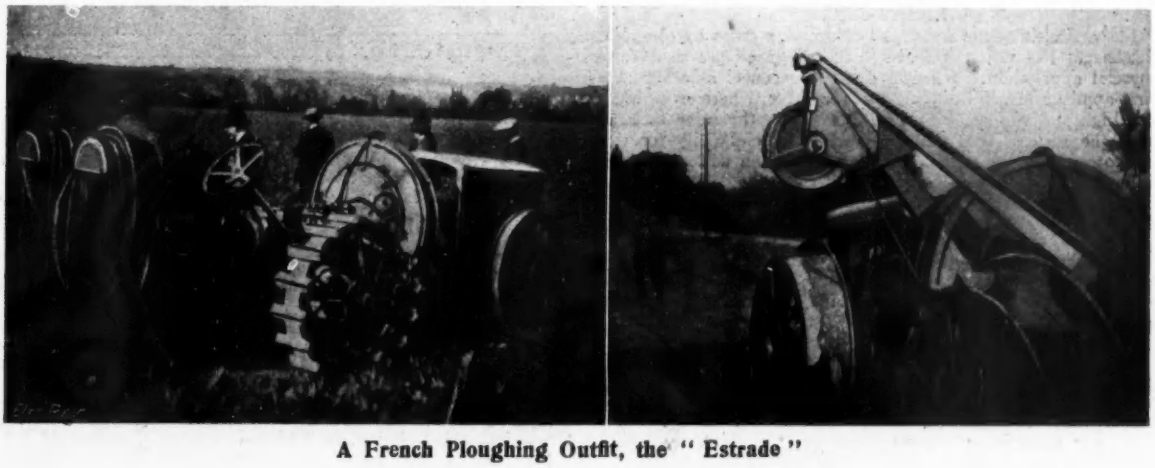
While the farm buildings of the large mechanised farm will not offer much scope for electrical appliances, other than a portable motor for the workshop, sawing, &c., the farm-house is worthy of consideration. The modern farmer with the "mechanised" outlook is likely to demand a home equipped on modern lines, and here the possible consumptions of electricity are not inconsiderable. Further, the advantages to be gained in the home are likely to be an important factor in encouraging the more general use of electric power. The main limit to the use of electricity in this way is the form and amount of the tariff. The need is for some form of multi-part tariff and for reasonable scales of charges.

### The Requirements of the Market Garden

The intensive market garden and "glass farm" is at the other end of the scale from the large arable farm. While the intensive value of the arable crop may be very low and need not necessarily vary from season to season, the intensive value of the market-garden crop may be very high and will almost certainly vary with the season. The greatest necessity, then, after fertility and nourishment, is *control;* the control of a high-grade grop may be important enough to justify using more expensive methods for both cultivation and acceleration of growth.

Speed of cultivation between crops is an important factor. Petrol-engine machines of the rotary tillage type are in use, but the spade and the horse plough are still the main implements of good cultivation. It is conceivable that a very promising development awaits the introduction of a cheap, low-powered electric cable set to plough intensively-farmed holdings. I have in mind the S.G.A. market gardening set with a 5-h.p. motor and the "Electro-Jardinière Rigondeau," which are designed for this type of work.

It should be possible to turn out a set of this description for less than £100. The comparison in this case is not with tractor cultivation, but with hand digging or, for larger plots, with horse ploughing. French figures for the performance of the S.G.A. set are interesting. With a furrow of from 25 to 30 yards in length, from half to three-quarters of an acre is



**A French Ploughing Outfit, the "Estrade"**

covered in a day; two men or a man and a boy are required to work the set. From my own personal observation of this set in action, I feel that a 5-h.p. motor is hardly adequate; 6 or 7 h.p. would be better.

If we do not study this need without delay, the internal-combustion engine may be first in the field, as it has been in the vineyards of the Rhine. There the whole process of cultivation, manuring, spraying, and harvesting is being revolutionised by the introduction of small, handy, and portable winding sets. But they are driven by petrol or crude-oil engines.

In considering the treatment of growing grops, after cultivation is over, it is even more important to recognise that market garden and glasshouse crops are not only valuable, but that their value varies greatly with the time at which they can be produced for sale. With tomatoes in particular it is essential to get some of the crop on the market as early as possible.

### Heating the Soil

An important factor to this end is to apply auxiliary heat to the soil about and under the roots. Now, while electricity cannot compete with coal or coke hot-water plants for supplying the general heat of the greenhouse, it is particularly suitable for this auxiliary heating by means of buried cables. These cables are easily laid after the ground is cultivated. Dr. W. F. Bewley has shown that this heating accelerates the crop and increases its market value.[1] He is now studying the question of cost. The most important factor is the first cost of the cable, and he hopes to reduce this by using bare conductors fed at low pressure.

In Germany low-voltage (40-volt) supplies and bare conductors have been used to supply heat for hot-bed frames.[2] Both at this and at ordinary service voltages the results have been favourable from an economic standpoint, and the adoption of the electrically-heated hot-bed is spreading in Northern Europe, particularly in Scandinavia. Apart from the relative costs of electricity and manure as heating agents, the deciding factor is likely to be the greater control which the electrical method gives. In addition, it would seem that it saves time both in supervision and operation and in the period wasted between successive crops. This application is receiving attention in this country, particularly by the research staff of the Shropshire, Worcestershire, and Staffordshire Electric Power Co., which is also experimenting with soil heating in greenhouses.

### Electro-culture

Electro-culture—the treatment of growing crops by electrical discharge—has not yet reached the stage of practical commercial application. When it does, it is conceivable that the first application will be to intensive farming, where crop values are high and the space covered is less. At the same time, it must be realised that the consumption of electricity for this purpose will be very small, and this application will not greatly interest the supply engineer.

Between these two extremes of agricultural practice comes the host of mixed farms, dairy farms, and poultry farms, all of which will gradually become more and more mechanised.

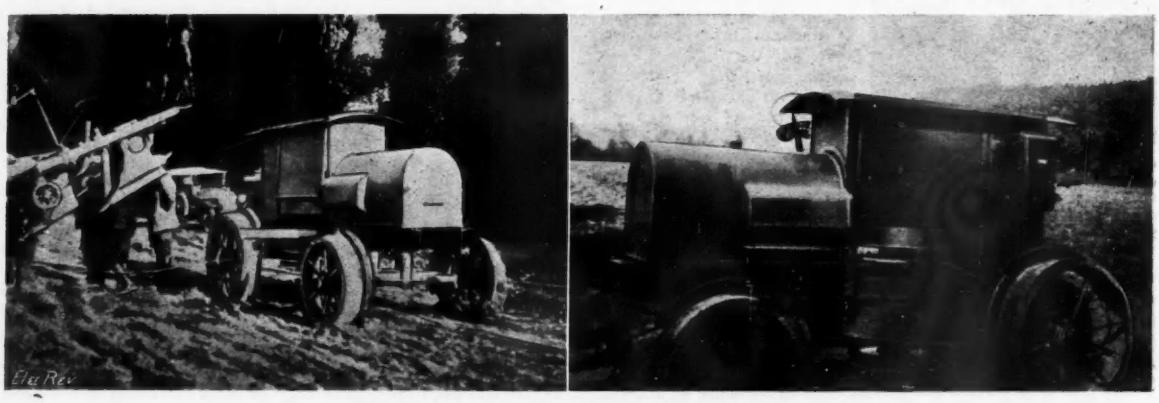
There is little chance that electric ploughing, other than for small plot work, will have any opening on these farms. The all-round uses of the tractor are even more valuable on these mixed farms than on the large arable farm. We have, however, a host of small power applications to which the electric motor is particularly well suited.

The driving of milking machines on the dairy farm, of food-preparing machines on the dairy and stock farms, and the supply of heat on the poultry farms can be done with greater cleanliness and under better control by electricity than by any other means. Most of these applications involve only the substitution of an electric motor for an engine, and call for no particular consideration. Heating and lighting appliances for poultry farms call for rather more consideration when planning an installation. All these applications, and more, are well described elsewhere.[3] All that is necessary here is a plea for the rational view of the application of electricity to farming.

No more mistaken policy could be devised than that of blind and indiscriminate advocacy of "electrification" of farm services. A certain farmer may decide to install a mechanical milking plant because he may have no source of electricity. If electricity is available at a reasonable cost, then he would be wise to install an electric motor as well as lights, and thus carry out his work in the most convenient and comfortable way available; but to insist that a farmer ought to uproot a perfectly good petrol engine in order to replace it by an electric motor may be bad policy. In a similar way, while it is evidently sound economics for a large poultry farm, such as the Buttercup Dairy Farm near Edinburgh, to install an extensive and elaborate electrical heating equipment, the small poultry farmer may avail himself of the more important conveniences afforded by electrical working without much expenditure.

I have in mind a farmer on the Aylesbury supply who has fitted immersion heaters to home-made water cans and, by means of series-parallel switches, has provided himself with a cheap and trouble-free means of warming the brooders. Again, on the same supply system, use is made of electricity to drive a mechanical milking plant on a very small dairy farm without any elaboration whatever.

It is by quiet and unobtrusive penetration rather than under stress of propaganda that the use of electricity for agricultural purposes will spread and become firmly established. Not that the importance of propaganda is to be under-estimated; it is indeed of great value so long as it is tempered with moderation. When the great reorganisation comes—suddenly or gradually—the influence of this peaceful penetration will show fruit in the form of a farming outlook ready to appreciate and embrace the proposals of the electrical industry.



**The S.G.A. Electric Ploughing Equipment**

[1] "Some experiments on the Heating of Glasshouse Soil by Electricity," paper read at the ninth International Horticultural Congress by Dr. W. F. Bewley, Experimental Research Station, Cheshunt.

[2] "Die Electrische Bodenerwärmung," by Dipl. Ing. Kind. Die Technik i. d. Landwirtschaft, December, 1929.

[3] "Electro-farming," by R. Borlase Matthews. Benn, 1928.

### B.S.S. for Tubular Traction Poles

A new edition of British Standard Specification No. 8 for tubular traction poles just published differs from the 1927 edition in that it is extended to include poles 33 ft. long, whereas previously only 31-ft. poles were included. This extension has been found to be necessary in view of the increasing use of the railless trolley 'bus, for which the longer poles are required on account of the greater number of contact wires that have to be supported. For the shorter poles the specification remains as before. Three strengths of 33-ft. poles are provided, and dimensions for outside diameters, lengths of section and minimum thickness are given, while details of the drop tests and bending tests are also included. Information regarding the weights of the various sizes of poles is given in an appendix.

Copies of the revised specification (No. 8-1931) can be obtained from the Publications Department, British Engineering Standards Association, 28, Victoria Street, London, S.W.1, price 2s. 2d. post free.

# International Discussions

## The second and third sections of the E.H.P. Conference in Paris were devoted to the consideration of transmission problems and metering

(FROM OUR SPECIAL COMMISSIONER)

AFTER the Sunday break which was taken advantage of by members to make organised trips to Deauville, Eguzon, or the Chateaux de la Loire, the work of the Second Section began on the Monday morning, June 22nd.

The Section Section* deals with questions of Insulators, Construction of Lines, Power Losses in Transmission Lines, Poles and Towers, Cables and Conductors, and finally Dancing Conductors. This last problem has appeared for the first time at this year's meeting, and promises to attract considerable attention from line owners in the next year or so.

The really outstanding contribution to the first item on the agenda of the Second Section is the report presented by Mr. Van Cauwenberghe (Belgium) as chairman of the Advisory Committee set up in 1929 to study the question of insulators. The report covers a number of problems involved in the study of insulators, and is the result of an excellent example of international co-operation. It can be divided into four groups: (1) High-voltage measurements; (2) The construction of insulators and the raw materials used; (3) Tests; (4) Operation.

### Comparative Insulator Tests

On account of the international character of the inquiry and the distances between the various engineers taking part in the work, it was decided at an early stage that steps should be taken to ensure that results obtained in various laboratories could be easily compared on a definite basis. Tests on the same string of insulators were carried out in Baden, Brussels, Manchester, and Paris, and the results obtained were found to be reasonably consistent on the dry flash-over tests, whereas on the wet test some variations were found. The discussion which took place on the question of measurements gave rise to some interesting remarks by Dr. Rayner on the very fine limits of accuracy obtained in the High-voltage Department of the N.P.L.

Several new methods for measuring the potential distribution along a string of insulators were described and discussed, amongst which is a method due to Mr. Drewnowsky (Poland), which has several novel features based on the zero balance principle; it is still in the course of development.

The second part of the report deals with the different porcelains in use which are divided into four groups according to their properties and treatment, and, although it did not give rise to much discussion at the time it was frequently referred to later as much of the information contained could be offered as an explanation of some of the observed incidents in operation.

The remaining groups of the report did not involve very much discussion, although perhaps they deserved comment. It may be that the very richness of the information contained in the annexes to the report required more time for considered examination than was available to the majority of engineers present before the discussion started.

### Condenser Bushings

Another paper which aroused a good deal of discussion, one might almost say controversy, was that presented by Mr. Imhof on the subject of condenser bushings. Two schools seemed to be formed almost immediately, the one in favour of the oil-filled type and the other in favour of the dry solid type. The exchange of views which took place tends to show that some new developments are taking place in condenser bushing design, due undoubtedly to the changing conditions of supply voltage. The fact that the original patents have expired and a number of firms with little manufacturing and operating experience of this type of bushing have been supplying them to the market seems to have a considerable bearing on the present differences of opinion.

At the conclusion of this discussion a communication was made by the International Radio Union on the question of broadcast interference caused by power uses. Interference was divided into two groups, that due to consumers' apparatus and that due to suppliers' installations. Little was said with respect to consumers' apparatus, as this is outside the scope of the Conference, but it was pointed out that considerable disturbance was caused by defective insulators, and it was suggested that steps might be taken to eliminate these at an early stage.

After a little discussion on the subject a suggestion was put forward that a small advisory committee should be formed to collect all information that might be available from the supply companies' side to form a basis upon which the two interests might come to some useful conclusions, and it was decided to refer the matter to the Council of the Conference for its consideration.

The insulator question was closed by the third report in connection with a special type of oil-filled insulator that has now been in use some six years along the sea coast of Morocco. The satisfactory operation of this insulator has continued, and its use has been extended to lines going considerable distances inland where trouble had been experienced due to salt deposits. The short discussion that followed showed that trouble had occurred in Germany in certain regions where the atmosphere was heavily laden with coal dust which was deposited on insulators. It does not appear, however, that any steps have been taken to try out the oil-bath type in these cases.

### Overhead-line Construction

In the section devoted to line construction, the paper read in connection with the proposed 400,000 Western European 'bus line came in for a considerable amount of criticism of detail, more particularly with regard to the device put forward for artificially improving the field distribution round the insulators by means of a secondary line connected to an intermediate point of the strings and maintained at a potential of the order of 150,000 volts. The scheme put forward has some interesting points, and contains some useful information for reference.

Considerable discussion took place in connection with the mechanical calculations for lines, the general feeling being that the present formulæ in use were very long and laborious in their application, whereas the use of diagrams introduced a considerable amount of possible error which in certain circumstances became cumulative. Various simplified diagrams and formulæ were put forward and discussed, and it was decided that a sub-committee should be formed, under the direction of Prof. Listz, to examine the formulæ and diagrams in use and to produce if possible a standard of international reference.

Prof. E. H. Lamb's paper on pole foundations, in which he expounded the theory he has developed, based on tests carried out on a model pole in different types of earth, did not seem to convince a number of continental engineers, who appear to hold the view that the applications of test results to field conditions may give rise to a good deal of difficulty. The main objection seems to be that the variation in the quality of soils and sub-soils is so great that they cannot be properly covered by this method.

### Reinforced-concrete Poles

A very interesting contribution was made by Mr. Silva on behalf of Mr. Della-Verde (Italy) in connection with the calculation for and tests of the poles of a 220,000-volt line. The poles used for this line are of reinforced concrete made by the centrifugal process, and their use involved a great number of problems on account of their height, the use of double poles, &c. This paper was accompanied by a motion picture showing the line in course of erection, from the preparation of the foundations to the placing of insulators in position. The amount of interest that was taken in this subject may be judged from the fact that the author was requested to give a second view of the picture before the close of the Conference.

The use of reinforced concrete for poles gave rise to a fairly wide general discussion, and brought to light the question of the difference between British and Continental practice. The most important difference is in the factor of safety used in the calculation of the various component parts and incidentally upon the allowance for conductor breakage. Mr. Morgan's participation in the discussion showed very clearly that, although the apparent factors of safety in use in Great Britain might be the same as those in use on the Continent, there was still a very great difference. He made it quite clear that a figure quoted as a factor might not have the same meaning here and abroad, and made an effort to obtain a clear definition of what is really meant by the term "factor of safety." The issue was very confused, and very little information on this particular point was disclosed. It remains very apparent that much can be done in the international field to obtain some agreed standard of comparison which at present is non-existent.

### Cables and Dielectric Losses

The afternoon's proceedings were opened by the report of the Advisory Committee on Cables and Conductors presented by Mr. Bakker (Holland). The report contains details of a number of standard tests for cables. The discussion that ensued was somewhat lengthy and arduous. Although a measure of general agreement seemed possible on some points, very wide divergencies of opinion were expressed on others, particularly in connection with the bending tests and dielectric loss tests.

In the circumstances it was decided that the committee should meet in the autumn and submit a programme of tests to cable manufacturers who have agreed to carry out the programme for the purpose of compiling complete specifications to be presented to the next meeting of the Conference to be held in 1933.

During the course of the discussion a good deal was said in connection with the measurement of dielectric loss by the Schering bridge method. Its value was very gravely questioned

*A report of the First Section appeared in the ELECTRICAL REVIEW of June 26th, p. 1083.

by one speaker in particular, who inferred that one could obtain any results that were wished, including even negative loss angles. Dr. Rayner gave a rather spirited defence of the method upon which the N.P.L. had carried out numerous tests for accuracy. He also could obtain negative loss angles, and caused considerable amusement by informing the meeting that he had published a pamphlet showing how negative angles could be obtained.

The subject of dancing conductors came into prominence for the first time at this meeting, and although it did not bring forward a large number of papers, the impression gained is that a great deal of attention will have to be paid to this essentially modern problem in the near future. The cinematograph film shown by Mr. Davidson (Canada) of a line under storm conditions with heavy movements in the conductors showed the importance that must be attached to the question, which has become disquieting only since the light type of conductor with increased tensioning has come into use.

### The Oil-less Circuit Breaker

Although, properly speaking, all switches belong to the First Section, MR. E. B. WEDMORE acceded to a special request to open a discussion on the oil-less circuit breaker. He gave an outline of the work that has been carried out in connection with the mechanism and the character of the arc, and of its behaviour during the transient conditions of circuit breaking and forecast a number of developments that will take place in the design of modern breakers. His summary was necessarily brief, but we can definitely conclude from it and the general remarks made after this summary that in this country we are abreast if not ahead of most others in the question of circuit-breaker research.

Mr. Clothier's contribution to this section was most enlightening as to British practice in connection with circuit protection. A film thrown on the screen showing high power tests confirmed the policy of British manufacturers in turning out material that will stand up to very exacting conditions.

A day's interval between the closing of the Second Section and the opening of the Third Section was devoted to visits to a number of places of electrotechnical interest, including the Vitry Sud power station, the million-volt laboratory, the Issy-les-Moulineaux power station, the Ecole Supérieure d'Electricité, a 60,000-volt outdoor sub-station, and the works at Precy, where reinforced concrete poles are made by the centrifugal process for electrical and other uses. The technique of this material appears to be very advanced in France, where considerable progress has been achieved in the finish of concrete standards in colour or in imitation stone with highly polished surfaces.

The fitting conclusion to the day was the return dinner given by the foreign delegates to their French hosts. This function was well attended and improved by one or two really short speeches. One novel feature was the vote of thanks to the organisers of the Conference expressed in very few words by representatives of about 30 countries in their own languages.

### Power-factor Improvement

Reactive power being the next item on the agenda, the meeting was opened by the presentation of the report of the Advisory Committee prepared by Mr. Budeanu (Roumania).

The question of improvement of power factor does not yet allow of any general rules being formed and the majority of cases must be taken on their merits. Various new devices, and improvements in connection with new devices were described and discussed. The static condenser would appear to be making considerable headway, particularly in those types which are designed upon the principle of unit construction which allows of replacements being made quickly and cheaply in case of breakdown. Price is an important point, and it is expected that although the price per kVA has fallen considerably, it will fall still further with the more general use of this type of apparatus.

One paper of particular interest described the manner in which a main line traction load was utilised not only to improve the power factor, but also automatically to improve and maintain the load factor at from 60 to 65 per cent., whereas it was formerly of the order of 30-35 per cent. The devices employed for this regulation are relatively simple and although, as the author states, they were put in on a large scale, the saving in running costs covered the initial expenditure in a little over one year.

### Earthing the Neutral

The neutral-point question again came up for review but here again no general rules can be laid down as to whether earthing is advisable, either direct, through resistances, inductances or through combinations. It does seem, however, to be generally agreed on all sides that even in cases where the neutral is definitely earthed, the insulation value of transformers and other apparatus should be maintained as though the neutral were insulated.

A certain amount of collective research work has been carried out since the last Conference, on the question of earthing plates, and from this it would still appear that the form of earthing plate or tube depends to such an extent upon the nature of the soil and the subsoil that no general rules can be put forward.

### Metering Large Blocks of Power

New instruments have been devised and produced for measuring reactive energy and for the calibration of meters used for this purpose. Among these special mention may be made of the calibrating device due to Mr. Iliovici and described in his paper on effective power meter standardisation which has gone a long way in the simplification of the problem.

This question was also touched upon by Mr. V. Z. de Ferranti, who pointed out the increased attention which is being given in this country to the refinement of detail in meter construction. This speaker also referred to the question of large blocks of power where the very thickness of the line traced on recording instruments may involve very large sums of money. He described very briefly a modern development of the recording type of instruments in which definite figures are used that shows a considerable advance over the line type of instrument.

Views on selective protection of networks indicated that modern conditions tend to increase relay speeds, although British practice as shown by a paper presented by Messrs. Leeson and Leben continues to move along different lines to Continental practice. The paper mentioned has another point of considerable interest, as it shows how the Merz-Price principle of protection, which is still in very extensive use, has been developed and improved to meet modern conditions.

The concluding hours of the Conference were devoted to the question of parallel operation of networks and show that the problem is now practically settled from the electrical point of view, and that the problem must be treated from the commercial side. Turbine governors must be developed to give a speed control practically as rapid as the variations of electrical load with particular reference to short circuit conditions. The description of several devices designed to effect this object concluded the proceedings.

# To Capture the Heating Business

## An important co-operative movement based on recognition of the fact that no one of the existing systems of electrical space heating is ideal

THE formation of the new company of BARKER, YOUNG AND CO., LTD., announced in the Financial Section of this issue, is the result of an effort, not to block out competition within the electrical industry, but to present a united front by three companies with established electrical space-heating systems to non-electrical systems—particularly the hot-water one. The older organisations concerned are Young, Osmond & Young, Ltd., the Morgan Crucible Co., Ltd., and Electro-Gas Development Co., Ltd. These companies will not lose their separate identities, and the new company will be purely a selling organisation. In the ELECTRICAL REVIEW of May 1st last was announced an arrangement whereby the sale of the "Morganite" system of radiant heating and of the "Electrorad" low-temperature panel system would be handled by the Electro-Gas Development Co., Ltd., with the "Morganite" radiation thermostat and control apparatus available for use with both systems. It is interesting to note that that development was a step towards the final and broader scheme which is the subject of this note.

The main idea behind the scheme is to produce as near as possible the ideal electrical space-heating system for each installation or class of installation by using any of the separate methods, or combinations of two or more, with the best control apparatus to meet the case, the system in each instance being decided upon purely on technical grounds.

Broadly the results of the co-operation between the three manufacturing concerns, which have involved a close study of some 5,000 quotations for all three systems, in order to decide on the best systems to adopt for various types of installations, are that low-temperature equipment should be used for really first-class work where the architectural features lend to the ideal system; for highly-ventilated buildings such as schools and open-air hospitals high-intensity radiation should be employed; and for use in large spaces such as in churches where it is not desirable to warm the whole building, but only the people, tubular heaters are ideal. One very interesting point is that the co-operation is likely to lead to a real effort to solve the domestic room-heating problem, in which connection it is believed that there is little to choose between tubular and l.t. panel heating, and also that there is scope for the combined heating and lighting units embodying high-intensity radiation panels. Of particular importance is that the control of any system, combined or separate, to be adopted is to be considered as the essence of the scheme, it being realised that any system cannot be a commercial proposition unless it is perfectly controlled—there must be flexibility.

One pleasing result of the development is that it will permit a measure of standardisation. Roughly about half the models of the equipment embodied in each of the systems will probably be eliminated. It is also encouraging to learn that the capital costs per installation will probably be reduced, and that the running costs will certainly be lower. The installation contractor will find much help in the scheme. At present generally he is necessarily unenlightened as to what is the best system to adopt for any installation, and as to where to apply for help. The new and older companies will not, of course, undertake installation work, but they will act in an advisory capacity whenever requested.

# Electrical Quotations

## The Importance of Attention to Detail

(FROM A CORRESPONDENT)

RECENTLY an inquiry was sent to seven manufacturers of three-phase induction motors, covering a number of machines and involving six different ratings. The motors were of the squirrel-cage rotor pattern complete with star-delta starting switches or compensators, most of the machines being fitted with pulleys and slide rails.

The inquiry was explicit in every detail and left no room for doubt of any kind as to what was needed. No extras of any description were called for, and the only indefinite feature of the inquiry was that, for one motor only, it was requested that the allowance should be stated if pulley and slide rails were dispensed with. In other cases the manufacturer's standard pulleys were acceptable, but it was asked that the dimensions be mentioned.

The inquiring firm did not stipulate a definite closing date for the receipt of tenders, as this was not of particular importance, and it was thought that "as early as possible" covered the point.

### The Nature of the Replies

Of the seven tendering firms, two replied by return of post, the other five taking from three to nine days to submit offers; of these five, four acknowledged the receipt of the inquiry. One tenderer neglected to state the difference in price if the pulley and slide rails were not ultimately desired for the appropriate item; only one tender mentioned the bare shaft dimensions for this item (they were not asked for, but were obviously necessary at some stage or other). Four of the tenderers quoted every piece of apparatus separately, and in each of the seven quotations unnecessary repetition was a feature. Every tender detailed for *each item* descriptive matter common to all items, causing needless typing. The practice universally adopted of quoting each accessory separately necessitated the purchaser making sundry calculations before it was possible to readily compare the offers. One tenderer omitted to give the time for delivery; another overlooked the request for efficiencies, &c.; a third did not state the pulley dimensions; while one, for some unimaginable reason, made out his tender with no semblance of order as compared with the inquiry!

### Insufficient Supervision

From observation of the tenders submitted for this and other inquiries it would appear that, too often, tenders are prepared with inadequate supervision by a senior and/or with insufficient regard for what may be considered, by some, minor points; neglect of these small points is frequently harassing to the purchaser. From the haphazard way in which one of the seven tenders was thrown together one could only assume that it was immaterial whether the order were secured or not.

No doubt if the inquiring firm had laid down a schedule in blank, its desire would have been complied with, but to send in an "attractive" tender is more important than to send out an "attractive" inquiry.

### How Tenders Might be Improved

The subject-matter of this brief article is by no means new; much has been written in similar vein in the last few years. It must be conceded that a very great improvement is apparent, but that there is still room for better work is not open to strong opposition. The suggestion is proffered that a manufacturer might hold a competition amongst his staff offering a suitable incentive or inducement with a view to ascertaining the most "attractive" tender prepared over a given period, the success or otherwise of the tender itself not being considered. In such a competition points should be allowed for clarity of expression, absence of verbiage, time taken in preparation, ease of "picking out" details, completeness of replies to requests for data, &c. Other points will readily occur to those constantly handling tender work. It is not suggested that every tender prepared in the trial period should be an entry for the test, as that may be impracticable, but this is only a matter of simple arrangement. Accuracy being a *sine quâ non* should possibly be entirely ignored in the allocation of points.

### The Elimination of "Padding"

Mention has been made of the superfluous typing in the tenders cited, owing to frequent repetitions. It would appear that the six items in question could have been adequately set out in tabular form, one table occupying less than half a page as against the one-and-a-half to two pages actually taken. In certain cases where the information asked for is such that it cannot be conveniently given in one table, it can be arranged in two or more tables; in this event an admirable plan is to have a price table and a technical data table. In the case of the inquiry to which reference has been made, the following would have sufficed, reduced to three items only, as being sufficient to illustrate the argument:

"Following are prices covering standard three-phase induction motors of the squirrel-cage rotor pattern suitable for —— volt, —— cycle circuit and designed for a temperature rise not exceeding —— after a continuous full-load run; the machines are of protected or enclosed ventilated type, as specified, and the prices include standard pulley, slide rails, and starting gear. The starting gear is of the oil-immersed pattern, complete with oil and the specified trips; it will be of the star-delta or compensator type as per the inquiry:—

| H.P. | Full load speed R.P.M. | Type of motor. | Type of starting gear. | Pulley. Dia. in. | Pulley. Face in. | Full load eff'y. % | Full load p.f. % | Price each complete. £ s. d. |
|---|---|---|---|---|---|---|---|---|
| 7½ | | Prot. | Star-Delta | | | | | |
| 15 | | E.V. | Comp. | | | | | |
| 20 | | E.V. | Comp. | | | | | ..... * |

* "Reduce by £—— per motor if pulley and rails are not required."

SHROPSHIRE WORCESTERSHIRE & STAFFORDSHIRE ELECTRIC POWER Co
AND
SOUTH WALES ELECTRICAL POWER DISTRIBUTION Co
DEMONSTRATION OF
ELECTRIC SERVICE FOR HOME & FARM

**The Attractive S.W.S. and S.W.P. Stand at the Agricultural Show at Hereford** **(see page 22)**

E

# Electrical Progress in France

## Exhibits at the Paris Fair indicate a growing demand for domestic apparatus and a trend towards improvement in quality

THE Paris Fair is beginning to rival that at Leipzig in the number of its exhibitors, although in general it deals with a more restricted class of wares. This year there were not far short of 8,000 exhibitors.

The Fair is a self-supporting co-operative undertaking under the patronage of the French Government, the City of Paris, Chambers of Commerce, and a number of trade societies and organisations. Electricity has now a building of nine bays all to itself, and rivals hardware in the amount of space occupied. About 50 British firms have taken part this year, but there were many more German concerns with much heavier appliances. Apart from two wireless concerns there were no British firms noticed in the electrical section.

**Sauria-Astrée Heater**

The Federation of British Industries for several years has had a bureau in a prominent position near the entrance to the Paris Fair to give information regarding British manufactures. The official in charge understands Continental methods. It is too often assumed in Britain that if a country has a protective tariff it is not worth trying to do anything there, but there is no doubt that in France, even in electrical matters, there are still openings for business, especially regarding smaller items. The electrical exhibits, as at the British Industries Fair, were mainly confined to apparatus and accessories of small size.

In the past, as a rule, the quality of the internal wiring work carried out in France has not been up to modern standards or comparable with that of the machinery and heavier apparatus turned out in that country. The spread of electricity has multiplied the number of people dealing with electrical domestic appliances, and the development of 220 volts to earth in rural areas has made it imperative to improve the quality of the appliances used in the home. An association of manufacturers has set up a committee with a competent jury for examination and testing to award a quality mark for what is considered to be reliable apparatus. Anything made to the same pattern and in a similar way by the same manufacturer is branded "Unis France." There is no doubt that this movement is beneficial in improving design and insulation, in the same way that analogous quality examination has improved standards in Germany and the U.S.A. The Union des Syndicats d'Electricité has got out a wiring code on modern lines which is encouraging better work.

Bayonet holders are standard for normal lamps. Hand lamps have given a good deal of trouble, and attention has been paid to their improvement, although the Germans, with what might be termed a rubber-neck and buffer pattern, seem to have designed one of the best of its kind, regarding safety and mechanical resiliency.

### Wiring Accessories

For a number of years the Bergmann system, with light rolled-joint brass or zinc tubes lined with treated paper, had a great vogue for house wiring in France, but now, following British practice, stout-gauge threaded-steel tubes with joint boxes and so on are coming rapidly into use, although fears of condensation troubles make many people use paper-lined tubes.

It is interesting to observe that the British enclosed-industrial-switchboard system, with screwed-up doors and extension facilities on the bookcase principle, is making way all over the Continent. Before the war the Germans did a large business in wiring materials and accessories in France, and there are signs that they are coming back again. The best wiring systems in the world are in use in Great Britain (lead covered, conduit, and so on), and there should be openings for our specialist concerns in France.

The French Thomson-Houston Co. has brought out a safety socket with a safety shield that is revolved after the pins are first placed in it and then the plug pins are pressed home. The shield twists back when the plug is withdrawn, thus covering the contacts. One did not notice any disk-shielded plugs of the type coming into vogue at home.

Of fuses, the Gardy two-pin plug type with a calibrated internal fuse wire, and also screwed-in fuses of the Siemens type, are popular. On the subject of earthing *versus* insulation, French practice has veered towards the latter.

Messrs. Trouvay and Cauvin, of Paris, have a series of porcelain headed industrial well-glass fittings and fittings for large shades, the porcelain interior parts are also fitted with rubber joint rings so that besides being shock-proof the porcelain parts are buffered together, the fragility is diminished, and there is no tendency for the screwed porcelain to work loose. There is a movement towards the use of 27 volts for lamps and apparatus in garages, stables, cowsheds, kitchens, wine cellars, bathrooms, and so on, and several makes of indoor and outdoor portable and bracket transformers were exhibited from 50 VA to 750 VA. A double filament lamp has been developed by the Société d'Electricité Mors, of Clichy; there is one normal contact in the cap and on the other side two contacts side by side; there are two sets of pins on the side of the cap; when one set is pushed inwards the other comes out. The filaments are used one after the other, and it is claimed that for 10 per cent. more in first cost the life of the lamp is doubled. The makers state that the lamps do not blacken, and therefore when using the second filament the efficiency is not lowered.

Electric water heaters are making progress, especially those arranged for night storage. A number of makers of domestic irons were to be seen, the handles not so well finished perhaps as those of British make; in some cases the terminals were of German pattern. The cordless iron, heated electrically on a plug stand with a thermostat auto-cutout, is finding some supporters.

### Cooking Appliances

In the matter of kitchen appliances it should be remembered that in France joints as such are not nearly so usual as in Britain, and the ovens are therefore small; this affects the design of both gas and electric cooking gear. There is much more stewing and frying, for which processes hotplates are required, and electricity does not as a rule show up as well as for baking.

The French foundries have for some time made a speciality of heat-resisting enamels in blue, green, dark red, and brown. During the last few years the electric stove has had a new competitor in stoves for petrol or petroleum. One would think that there might be a market abroad for saucepans with thick ground bases, which give a better efficiency with hotplates than the normal thin ones, but there was not quite so much aluminium ware on view as at the Birmingham and Leipzig Fairs.

A feature of the show was the number of internally heated nickel-plated pots for milk and so on, and the number of "express" coffee machines for "petit déjeuner" for two or three cups. The express system of filtration and supply under pressure first came into use for cafés in Italy, and now it has become popular elsewhere. As the water boils it is pressed up through the ground coffee placed in a filter box.

Owing to the fact that the voltage is the same almost everywhere, namely, 110 to earth, a favourite Christmas gift is a little electric iron or other small piece of apparatus which can be used when travelling, being attached to an adapter to lamp sockets in hotels. Judging by notices in some hotel bedrooms the proprietors are not enthusiastic on the subject.

### Electric Heating

As the average Continental householder has not been accustomed to open fires, no attempt is made to imitate coal fires in the design of electric radiators, which are as a rule for occasional use during the changeable weather of the spring and autumn.

One of the neatest radiators on view is the Sauria-Astrée, the heating elements of which are made up as unit cells each of 250 watts. The air to be heated passes through the cells, which give out a cheerful glow; the number of cells in use can be varied.

**An Electric Alarum Clock**

There were several makes of night heat-storage radiators on view. These are intended for lobbies, offices, and so on. One undertaking in Paris undertakes contracts to heat schools and so on electrically for so many months in the year, to a minimum temperature during working hours, at an overall price.

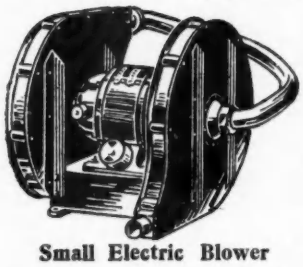
### Washing Machines

French people cannot afford to pay £25 to £50 for washing machines as Americans will. For some time the wood dolly-tub washer with a motor below with a belt drive was popular;

they cost about £6 to £8, or with a belt-driven wringer attachment about £10. Driven wringers are the exception.

There is a movement towards all metal washers, for one reason because they can be heated by gas, and in France many gas companies own electricity works and *vice versa*. A well designed little all-metal enamelled washer is the Conord. It is made in two sizes for electric drive; it sits on the floor on rubber feet. The washing is placed in the aluminium cylindrical cage wash basket with hot water or the water is heated from below. While washing, the cage is reversed by means of a well-made machine-cut gear below and, when the washing process is over, the water in the container is emptied. By means of a clutch gear the reverser is then thrown out of action and the cage is revolved acting as a centrifugal dryer. The 50-W motor of the universal type is placed underneath well out of the way. The small size is 17 inches diameter and 22 inches high, and the larger 22 inches diameter and 32 inches high.

### Vacuum Cleaners



**Small Electric Blower**

Regarding vacuum cleaners the metal container type that stands on the floor with a suction tube seems to be more popular than those with a bag, although as in Germany the miniature bag type for operation with one hand for cleaning furniture and so on is becoming popular; several makes sell at about £5. Cleaners with rotating brushes have not so much vogue as those with plain suction. A new type is the Era; it is made in the form of a long nickelled tube about 3½ inches diameter, with the motor at the handle end and a suction shoe at the other, the dust being collected inside the metal tube; it looks too long to be convenient for dealing with furniture.

### Fractional Horse-power Motors

Quite a number of makes of miniature motors for domestic and other duties were on view. Sewing machine motors with regulators were shown from about £2 16s. Several makes of gramophone motors were to be seen, but electric driving of pianolas was not so much in evidence.

A multiple portable drill appliance of German make was on view. This is intended for numerous drilling and milling jobs around the woodworker's shop. The French are rivalling the Americans in the matter of small hand and bench drills, both for electric and manual drive.

The Cotna electric clock is wound up automatically off the electricity supply; its cost for current is a few pence only per year, and it can be combined with an alarm and a lamp that will wake the slumberer, and switch on a lamp for which the clock forms the base.

### Baking Ovens

Although perhaps the electric oven for making high-priced pastry shows up the best owing to the small relative weight of the material to be heated, and therefore the small cost of the energy required relative to the sale price, nevertheless bakers' ovens for bread making are making progress, especially when night storage heat is concerned. It is remarkable how closely makers of electric ovens in England and France have developed very similar designs. For liners and warships, electric ovens and cooking appliances have the advantage that galleys can be placed exactly where most convenient without the necessity of arranging for steam pipe trunks for steam kettles, flues for cooking ranges, or bunkers for coals.

In central Paris the Power Company supplies energy between 6 p.m. and 7 a.m. and during the long luncheon interval from 11 a.m. to 1 p.m. at 0.6. per kWh. According to the Société Parisienne d'Etudes Spéciales, French bread takes with heat accumulation 13.5 to 18 kW per 100 lb. of bread. As a medium for accumulation a material is required that has great heat capacity per unit of weight and volume, that will not take too long to absorb heat, and will not give it up too rapidly. Sand, soft stone, and cast iron have been used. The above-mentioned company uses a heavy calcareous conglomerate which can take up 276 calories per cubic decimeter when heated to 572 deg. F. which has been generally adopted.

Messrs. Morari, of Paris, have made a speciality of lamp stands and reflectors for illuminating the interior of baking ovens; thick slabs of glass are used as a protection. The question of heat insulation of minimum volume is of great importance; this, with the weight and the absence of flues, also affects the position in a building in which an oven can be placed. Makers of other forms of oven are not standing still, and they too are taking to scientific insulation, self-contained types, and arrangements to encourage cleanliness.

### Electric Motors

Messrs. Drouard & Gillot, of Paris, have developed auto-starting gear for three-phase, slip-ring motors, contained in an oil bath in a vertical cylinder. The resistances in the rotor circuits are placed in parallel with choking coils. The periodicity in the rotor circuit varies as the speed rises; at starting it is 50 and at full speed it depends on the slip. With 50 periods in the rotor the choking effect drives the current through the resistances; as the periodicity falls the choking effect is reduced, and less passes through the resistance and more through the chokers. When up to speed the resistance current is very small, and the slip rings are then short-circuited by an automatic switch. The use of the oil bath enables very slow starting against heavy loads to be obtained with safety, quite automatically.

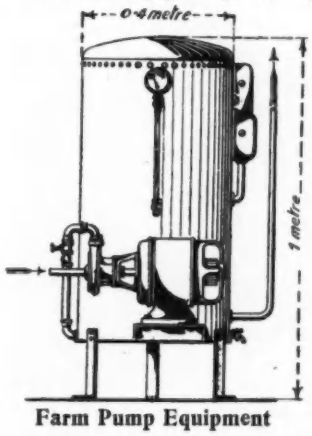
In no country in the world has the small direct-coupled motor pump been so much in demand as in France; about 60 firms were showing electric pumps of various types. The French distribution grid is meaning genuinely economic orders for scores of firms for handling water from deep and shallow wells, springs, streams, ponds, and so on. With about 22,000 rural communes electrified at an insignificant government risk, the large rural community in France is jumping at the convenience for household, industrial, and farm service that an electricity supply can give. The prices of some of the small sets are sufficiently reasonable to attract business. Fear of frost troubles is making the system of storage in a vertical cylinder in a cellar against compressed air, with relay starting, a popular method for farm supplies as compared with an elevated tank.

Automatically controlled ozone water purifiers have now been developed by which water can be sterilised for domestic use. The Otto Company makes apparatus to hang on the wall which can be placed on the water pipe leading to the house taps, the current being taken off the house service. If the power fails the water can be cut off automatically so the purity of the water is safeguarded.

Messrs. O. Galoup, of Paris, have developed a series of motor-driven blower fans starting in very small sizes for various industrial applications, especially for blow-pipe work, glass blowing, forges, and so on.

Aeroplane research in the matter of streamlines, guide blades, and so on, has stimulated investigation into the design of high speed ventilating fans of the propeller type. The firm of Messrs. Boirault, of Paris, licencees of the British Aerotechnical Co., Ltd., showed a number of fans, with aluminium alloy blades with streamline motor shells and air inlets and outlets for which many advantages were claimed.

Electric spot welding is replacing riveting. The Sciahy Co., of Paris, had a large photo of a spot welder with a gap like a hydraulic rivetter with arms 6 ft. 8 in. long and a gap of 40 in. for use on railway wagon building, with steel plates 7/16 in. thick. Some of these machines are arranged with the electrode closing gear operated by means of compressed air and a portable foot pedal. Automatic cut-off gear has reduced the power required at each spot weld. The l'Electromagnetique, of Pautin, states that one of their machines makes 2,000 spot welds per hour in the manufacture of metallic venetian blinds.




**Farm Pump Equipment**

In the matter of haulage in or around factories and so on, accumulator trolleys are being largely used, also accumulator locomotives for narrow gauge works railways. For shunting work in connection with main-line railway stock the Diesel locomotive seems to have caught up the accumulator, and judging by the number of different makes on view at the Fair has passed it. Both types have the advantage over steam locomotives in the absence of stand-by losses and saving in labour.

T. RICH, A.M.I.E.E.

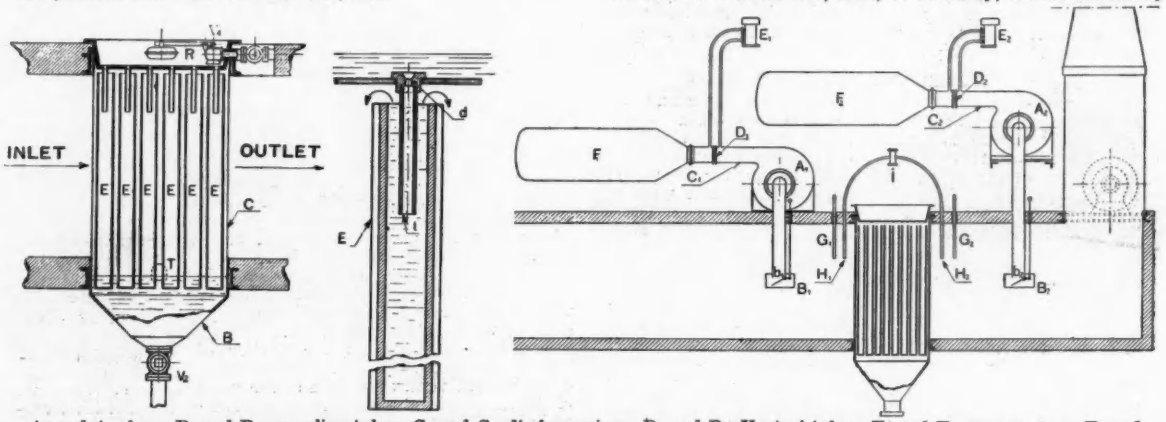
### French 200,000-V Cable-testing Installation

The Oerlikon Co. has recently completed the installation of 200,000-V testing plant at the works of the Société d'Exploitation des Cables Electriques, Systeme Berthoud, Borel & Cie, at Annonay, Switzerland. The plant will be used for carrying out continuous pressure tests of drums of cables and produces the necessary pressure by means of a single transformer with an earthed pole, the secondary winding of which is so arranged that it can be connected either in series or in parallel to obtain a full output of 1,200 kVA at either 100,000 or 200,000 V. The alternator used with the set has a capacity of 360 kVA and is directly coupled to a synchronous induction motor having an output of 110 kW, the machine being also used for the compensation of the wattless load of the internal distribution system of the works. The arrangement of the installation was the subject of special consideration in order to ensure ready access to the plant as well as the ease of its control and supervision. The transformer is located in a pit so that its cover lies flush with the floor of the cable room. The control gear and instruments are all grouped on a switch desk and a panel in the control room, below which are located three reactance coils for the compensation of the capacity current, one of the coils being adjustable.

# Dust and Sulphur Removal Plant

## A demonstration of the removal of dust from the flue gases of p.f. fired boilers by a "Modave" arrestor was convincing

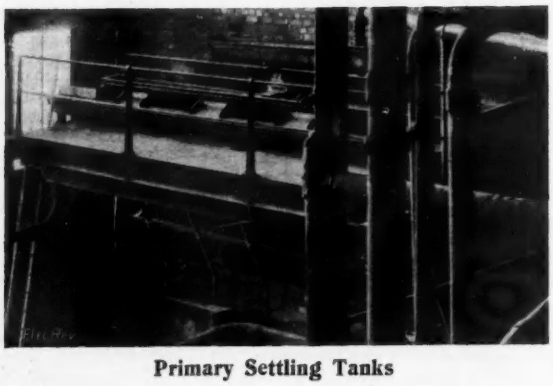
ALTHOUGH it is of Belgian origin the "Modave" dust and sulphur arrestor which is being introduced in this country by Alfred Herbert, Ltd., is likely to be manufactured at home by that firm. The equipment has already been installed and given satisfaction at several Continental power stations, including the Vitry and Gennevilliers installations in Paris, as well as at the Billingham factory in England of Synthetic Ammonia and Nitrates, Ltd.




A, and A,, fans; B, and B,, sampling tubes; C, and C,, dischargepipes; D, and D,, Venturi tubes; E, and E,, manometers; F, and F,, filter bags; G, and G,, thermometers; H, and H,, connecting tubes for differential manometers I

**Arrangement of Elements and Water Inlet Plant Lay-out for Efficiency Test**

The following claims are made for the system: the efficiency of the apparatus is not affected by the size or mass of the dust particles; there is no wear because there are no moving parts; as the plant is entirely static no power is absorbed; being placed between the arrestor and the chimney the induced-draught fan has only clean cooled gases to handle; no atten



**Primary Settling Tanks**

tion is required, the plant being automatic in operation; the equipment takes less space than apparatus designed for dry arresting; the dust is recovered in a state easy to handle.

### Construction and Operation

Referring to the illustrations, the apparatus consists of an upper tank R in which a constant level of water is maintained by a ball valve $V_1$. Orifices *d* in the bottom of the tank are connected with tubes *t* which lead into elements E. The elements are closed at the bottom and are square in section with their outer surfaces concave. The elements are mounted vertically in rows and so arranged that the flue gases follow a tortuous path through the nest. They are enclosed in a steel casing C. Beneath the elements is a hopper-shaped tank B with a valve $V_2$ at the bottom. The water in this tank is kept constantly at such a level that the bottoms of the elements dip into the water.

Water flows through the orifices in the upper tank into the hollow elements, overflows and runs down all four sides, resembling somewhat a film on the exterior walls, into the bottom tank. The gases enter the apparatus normal to the axes of the elements, come into contact with the wet surfaces to which the dust particles stick and are washed down to the bottom tank. The dust is then carried away through valve $V_2$ and is run either to waste or to settling ponds.

### Settling Equipment at Coventry

In the actual installation which we saw demonstrated at the works of Alfred Herbert, Ltd., at Coventry, the dust is finally collected in a concrete tank arranged with a number of weirs of gradually decreasing depths. It is interesting to observe the increasing clearness of the water progressively at each weir. But the solution entering the settling tank is only a concentrated portion of that from the actual arrestor, 30 per cent. of the water being separated in an intermediate partial settling-tank system. This consists of a series of metal troughs and a hopper, fitted with a weir, in which the concentrated solution is collected. This intermediate system is at a higher level than the final settling tank, and the concentrated solution is removed from the hopper through pipes under gravity.

### Efficiency Determination

For the determination of the efficiency of the apparatus as regards dust arresting, samples of the gases are taken from the flues at the inlet and outlet sides of the plant proper through tubes $B_1$ and $B_2$ and conveyed by fans $A_1$ and $A_2$ of equal capacity into bags $F_1$ and $F_2$, the actual gases passing through the fabric of the bags and the dust being retained within the bags. The weight of gas discharged by each fan is calculated from the Venturi diagram and temperature readings. Knowing the total weight of dust collected in the filter bag $F_1$ and the weight of gas discharged by the fan $A_1$, the weight W of dust per lb. of gas before entering the dust arrestor can be determined. In the same way the weight *w* of dust per lb. of gas after leaving the dust arrestor can be found, so that

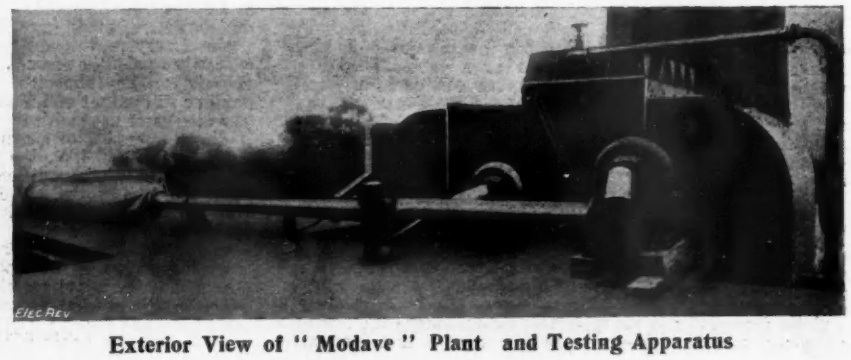
$$\frac{\text{Weight of dust caught}}{\text{Weight of dust to be caught}} = \frac{W-w}{W} = E$$

where E=efficiency of the apparatus.

For the actual test witnessed by us E worked out at 90.2 per cent. for ordinary firing conditions.

### Sulphur Removal

The arrestor is also claimed to be efficient for the removal of sulphur from flue gases. During their passage through the apparatus the gases come into intimate contact with the water flowing down the sides of the elements and the sulphur oxides are readily absorbed. The acids which are thereby formed react to some extent with the alkaline dust which has been caught by the dust arrestor.



**Exterior View of "Modave" Plant and Testing Apparatus**

# Coal Handling at Great Yarmouth

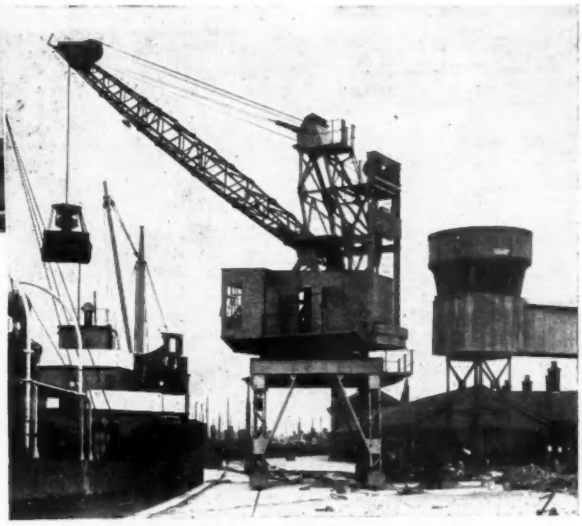
## The new plant incorporates a hopper specially designed to prevent the issue of dust in its vicinity

**Cranes, Hopper, &c., at Stock Yard**

AN installation which has recently been put into operation by the Great Yarmouth electricity undertaking for the handling of coal from sea-going vessels at the Fishwharf quayside to the generating station some 200 yards east is capable of dealing with 100 tons of fuel per hour. At the quay end of the equipment there is a portal travelling crane fitted with a 3-ton grab which transfers the coal from the holds of the steamer to a receiving hopper mounted on the quay. For reasons bearing on Yarmouth's notoriety as a famous fishing port, the hopper is of special construction to ensure that the process of unloading will not result in the issue of dust in the neighbourhood.

From the receiving hopper the coal is fed to a belt conveyor by which it is carried across the wharf to a stock yard where it is automatically weighed and transferred to another belt conveyor. This second conveyor discharges into the stock yard or across the road into the main coal store adjacent to the generating station.

For handling the coal in the first stock yard there is a grabbing jib-crane mounted on a bridge crane to which is fitted a hopper. By this means the coal can be suitably distributed in the stock yard or fed back to the conveyor, through the hopper at the end of the crane as required.

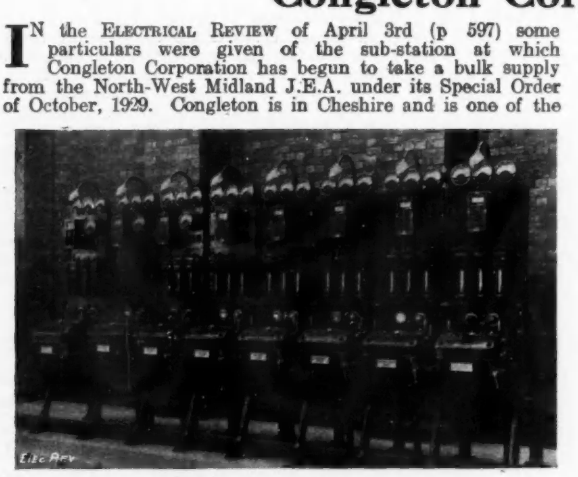


**Portal Crane and Hopper at Quay**

The whole of the handling plant was manufactured and installed by Herbert Morris, Ltd., and is electrically driven.

# Congleton Corporation Supply

IN the ELECTRICAL REVIEW of April 3rd (p 597) some particulars were given of the sub-station at which Congleton Corporation has begun to take a bulk supply from the North-West Midland J.E.A. under its Special Order of October, 1929. Congleton is in Cheshire and is one of the



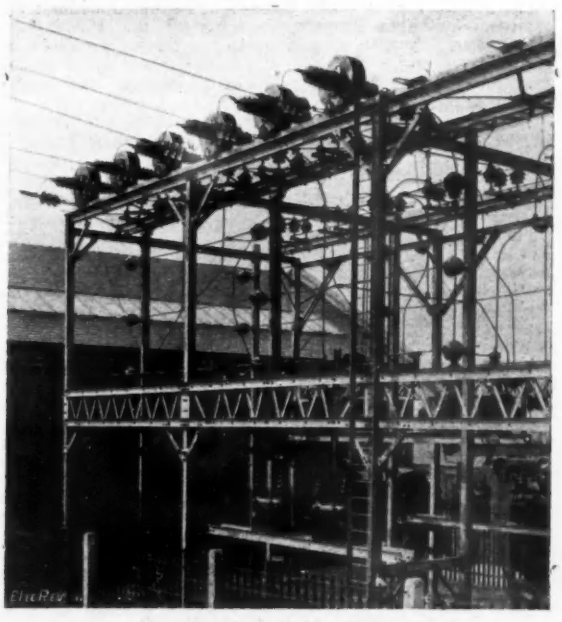
**The Low-voltage Switchboard**

oldest boroughs in the country, having obtained its charter in 1272. It contains many fine examples of half-timbered building, including the well-known 15th century Lion and Swan Hotel. It is now chiefly an industrial centre noted for the manufacture of silk, fustian, and tobacco, and towel weaving. Some 350 lighting and domestic consumers have already been connected and it is anticipated that the many large mills in the town will also become consumers. The town is, moreover, the centre of an important agricultural district and milk is concentrated at two large and up-to-date depots for which large supplies will be required for power. It is proposed to hold an exhibition in the Town Hall next September, and the Corporation has decided to adopt a scheme of assisted wiring. The high-voltage system of the J.E.A. which terminates at the sub-station was dealt with in the previous article, but we might mention here the use, by Mr. C. H. Yeaman, of different coloured insulators on the two circuits, only one of which is kept alive.

The nine-panel 3,300-volt switchboard in the sub-station is of the Reyrolle draw-out type; two panels control the incoming feeders, and the others control two smaller transformers in the building and also the feeders to the E.C.C. kiosks containing two 50-kVA 3,300/400/230-V Met-Vick transformers which are situated in the more remote parts of the borough.

The l.-v. 3-phase 4-wire network in the central portion of the area is controlled by an eight-panel iron-clad draw-out Ellison switchboard. Underground cables have been laid by the Macintosh Cable Co., of Derby, in all the principal streets, and in many cases ducts have been installed in order to avoid opening the ground for extensions.

The whole of the works are being carried out under the supervision of Mr. Arthur Pluck, borough electrical engineer. Messrs. Arthur Ellis & Partners have acted throughout as consulting engineers to the Corporation.



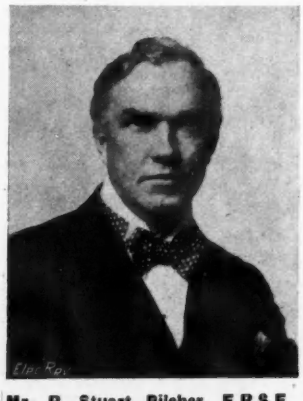
**Termination of 22-kV Lines**

# Municipal Transport

## Discussions regarding the effect of the new Road Traffic Act on municipal control formed the principal theme of the Southampton Conference

THE thirtieth annual conference of the Municipal Tramways and Transport Association was held in Southampton from June 23rd to 26th, Mr. R. S. Pilcher being in the chair throughout the proceedings.

A civic welcome was accorded the Association when it met in the Chantry Hall, St. Mary Street, on Wednesday, June 24th, by the Mayor of Southampton (Councillor E. W. Cross), who called attention to the fact that the present tramway manager in Southampton —Mr. P. J. Baker—had succeeded, where others before him had failed, in designing a covered top deck tramcar which would pass under the historic Bargate of Southampton.



**Mr. R. Stuart Pilcher, F.R.S.E., this year's President of the Municipal Tramways and Transport Association, is General Manager of Manchester Corporation Transport Department** *(Photograph by Lafayette, Ltd., London)*

Among those present was M. de Becker, the secretary of the International Tramways Union, who asked that a larger number of tramways and transport authorities in Great Britain should join the International Union. At the present time only three or four municipal transport authorities in this country had joined, and the number was not sufficient to justify the adoption of the English language as an official language, in addition to French and German, for the Conferences held by the International Union. He extended a cordial welcome to the next International Conference to be held at The Hague in the summer of 1932.

The presidential address was then delivered.

In the course of his remarks, the PRESIDENT referred to certain new regulations under the Road Traffic Act, one of which makes it necessary for two men to be employed on vehicles carrying more than 20 passengers. This, he said, would put out of use many of the one-man vehicles now being operated because the revenue on the routes served by these vehicles was not sufficient to meet the extra cost of two men. The regulation would actually increase unemployment. He expressed the personal opinion that the regulation would be withdrawn. Protests had been lodged by the Association against another regulation fixing the maximum number of standing passengers at 25 per cent. of the carrying capacity of the vehicle (and not more than five persons).

The President also mentioned that the Association had appointed to its staff a technical assistant whose services were at the disposal of any of the undertakings for investigation into problems that might arise from time to time.

The annual report of the Council was adopted without discussion. Alderman Ellaway, chairman of the Birmingham Corporation Transport Department, was elected president for the ensuing year, and Mr. C. Furness, borough electrical engineer and tramway manager at Blackpool, was elected vice-president.

The remainder of the first session was devoted to a discussion of the ignition-compression engine for use on motor 'buses.

### Anomalies Arising out of the Act

On Wednesday afternoon a paper was read by Messrs. J. Barnard (Bolton), A. R. Fearnley (Sheffield), and Mr. J. F. Cameron (Northampton). This dealt with the Report of the Royal Commission on London Traffic and the conditions that have arisen under the Road Traffic Act.

In the discussion on this paper, MR. C. OWEN SILVERS (general manager, Wolverhampton) advocated the use of trolley 'buses in preference to petrol 'buses.

MR. J. BARNARD (Bolton), in the course of some additional remarks, contended that it would be a long time before the tramcar disappeared in large centres of population. At the same time, he agreed that there was a definite field for the trolley 'bus and the petrol 'bus, and expressed satisfaction that in the North-Western Area formed under the Road Traffic Act they had as chairman a practical transport man in Mr. Chamberlain, who had been manager at Leeds and at Belfast.

MR. H. A. BLACKBURN (general manager, Great Yarmouth) complained that no protection was being afforded against private 'bus competition to a corporation which had converted a tramway route to a 'bus route. Protection should be granted in such cases because the capital expenditure on the old tramways had still to be paid off.

This point was also dealt with by a number of other speakers, and there was general complaint that the decisions of the Commissioners on this matter varied in the different areas. It was also urged that in seaside towns where the revenue from traffic during a few months had to carry the undertaking on for the rest of the year, protection should be given to municipalities from competition by private 'bus companies.

MR. P. PRIESTLY (general manager, Liverpool) and MR. J. M. CALDER (general manager, Reading) complained of delays and anomalies in the operation of the Road Traffic Act.

### Large Traffic Areas Necessary

After several speakers had urged the Executive Council to take action to see if some guiding general principles could be laid down for the Traffic Commissioners, in order to ensure greater uniformity of policy in the various traffic areas, Councillor P. J. DOLLAN (convener of the Glasgow Corporation Tramway Committee and a Traffic Commissioner) strongly criticised the Road Traffic Act as impeding the progress of municipal transport throughout the country, and complained bitterly of the delays and what he alleged to be the deliberate obstruction of the railway and 'bus companies in the operation of the Act. He saw very little hope, as things were at present, of development for municipal transport under the Act. He strongly urged municipalities to deal with transport over large areas, and advocated protection for tramways against 'bus competition in view of the large sums of money spent upon tramways.

As a result of this discussion, the Executive Council of the Association held a meeting, and it was decided to approach the Minister of Transport regarding the various grievances that had been mentioned.

### Co-ordination of Transport Services

On Thursday morning, June 25th, a long discussion took place upon the paper by Mr. J. M. Calder, general manager of the Reading Corporation tramway system, entitled "Road Passenger Transport Services: Recent Developments and the Outlook: Where Do We Stand?" The discussion was on somewhat similar lines to the discussion on the previous paper.

MR. J. BARNARD (general manager, Bolton) spoke of the co-ordination of the road transport services that has been carried out in Lancashire and of the difficulties that have been encountered in getting some of the companies to join in. He also complained of the manner in which some municipalities desired to keep within their own areas and refused to allow vehicles to come in from outside.

Bailie P. J. DOLLAN (convener, Glasgow Corporation Tramway Committee) suggested that the scope of the Association should be changed and the title altered to that of Municipal Transport, Ltd., with power to amalgamate and rationalise municipal transport in the same way as had been done in the shipbuilding industry. The Association should have power to wipe out redundant and inefficient municipal transport systems. Control by means of Joint Public Boards was very different to working arrangements between a number of authorities, such as had been made in Lancashire. Municipal transport, he said, was suffering from the lack of a few men like Lord Ashfield, and unless active steps were taken there was little doubt that the Minister of Transport would apply to the provinces the principle of the London Passenger Transport Bill.

### The Annual Dinner

The annual dinner of the Association was held at the South Western Hotel, Southampton, on Wednesday, June 24th.

The PRESIDENT took the chair and, proposing the health of "The Minister of Transport," mentioned that some of the matters that had been under discussion during the Conference were to be investigated by Mr. H. Morrison.

MR. HERBERT MORRISON, responding to the toast, spoke in terms of high praise of what the municipalities of the country had done for road transport and of the manner in which tramway rolling stock was now being improved. Where, on traffic grounds, or for financial reasons, tramcars were necessary, then the vehicles should be as attractive and comfortable as possible. Both the municipalities and companies were doing much in this direction, and he specially mentioned the London County Council and the London United Tramways, Ltd. Continuing, the Minister said it was inevitable that the area of passenger transport operation should become larger. That was why he had always urged local authorities to recognise the need for co-operation, because if they insisted on the maintenance of rigid municipal areas in transport management they would surely "lose the 'bus." As the areas of transport became bigger, there arose the question of the best form of management and administration. He had increasing doubts whether formal nineteenth century democracy, either in the person of a Minister of the Crown or local authority, was suitable for the management of big publicly owned business undertakings, and it was for that reason he had advocated, in the case of the London passenger traffic scheme, a small business board which was free from all political influence. The same principle might have to be applied to the provinces, but a great deal depended upon the manner in which the transport authorities co-operated with each other.

# New Apparatus and Devices

## for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

### Vacuum Pumps

The EISLER ELECTRIC CORPORATION, 756, South 13th Street, Newark, N.J., has recently re-designed three sizes of its "High Vacuum" compound pump line, "Midget," "Super-Midget" and "Standard." These new units are each driven by a reduction-geared motor and the direct drive is noiseless. Each unit is self-contained and requires no preliminary or finishing pump. It will produce a vacuum of 0.05 micron of mercury when connected to vacuum-tight system in which no vapours are given off. It is immersed in vacuum oil, the level of which is above the pump unit. This aids effectively in sealing the pump from the atmosphere and distributes any heat that may be generated by friction, preventing displacement of parts through expansion. The pump is of all-steel construction and all parts are accurately ground and lapped.

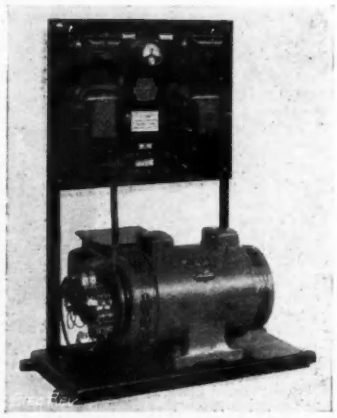
### An Automatic Kettle

Manufacturers of electric kettles have realised for some time that the burning-out of electric kettles is not good business for them, and most of them have introduced kettles fitted with devices for cutting off the current when they boil dry. The latest of these models is one produced by Messrs. W. T. FRENCH & SON, Browning Street, Ladywood, Birmingham, which is only slightly dearer than the non-safety type made by the firm. The device is not too sensitive and operates only after a short interval when the dry point has been reached. It is simply reset when the kettle cools down by pushing back the plunger, which is released when the cut-out device acts. The kettle itself is produced in four sizes and three styles. The body can be of aluminium, polished copper, or nickel-plated copper. The aluminium type is made in 1½-pint (400 W), 2-pint (850 W), 3-pint (1,100 W), and 4-pint (1,400 W) sizes. The copper kettles are produced in the three largest sizes only, and in their construction the body portion is spun in one piece and the skirt is then rolled on to this, which has obviated the soldered bottom. The spout is silver-soldered to the body. "Chromalox" elements are employed; these are very robust, are entirely free from sagging and are unaffected by vibration. As our readers are probably aware, these elements consist of a nickel-chromium ribbon or coil embedded, under hydraulic pressure, in a refractory material. By this means a high wattage density per sq. in. is obtained. A sectional view of the "Mysto" kettle appears above.

**The "Mysto" Automatic Kettle**

### Rotary Rectifier Outfit

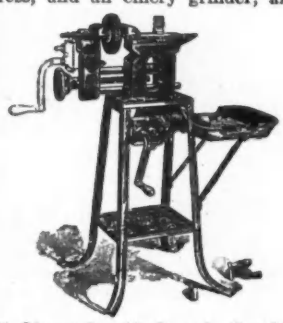
With the introduction of talking pictures it is necessary to have pure d.c. for exciting the moving-coil speakers, and to meet this requirement the CRYPTO ELECTRICAL CO., LTD., Acton Lane, Willesden, N.W.10, has produced a compact rectifier outfit consisting of a commutating rectifier, static transformer and polarity panel. By mica insulating and impregnating in vacuum the windings have been rendered dirt and moisture proof; the commutator and brush-gear are very robust; and the ball bearings are magazine lubricated. The equipment is made in various sizes all of which operate at 90 per cent. efficiency. Two models, 25 and 50 A, are completely self-contained and occupy only about a quarter of the space required by a motor-generator. Model 1 F.C.R. is designed to give on single-phase, 80 V, 25 A rectified current for supplying the arc and 24 V, 5 A, d.c. for supplying the speakers for the talking-picture equipment. On 3-phase this machine gives 80 V, 25 A rectified current and 30 V, 6 A, d.c. No. 2 F.C.R. model is designed to give on single-phase, 80 V, 50 A, rectified current for the arc lighting and 30 V, 6 A, d.c. for the speakers. On 3-phase this machine gives 80 V, 50 A rectified current and 30 V, 10 A for the speakers. Owing to the peculiar properties of the rectified current the commutating rectifier has been found to produce an exceptionally white light.



**"Crypto" Rotary Rectifier**

### Combination Forge Outfit

The CHAMPION BLOWER AND FORGE COMPANY, of Lancaster, Pa., U.S.A., has developed a combination repair outfit that should prove useful for many applications in electrical transmission work. The equipment is strongly made with stiff legs of angle steel well braced and riveted, and comprises a forge, vice, anvil, pipe-vice, drill press, and an emery grinder, all parts lending to immediate change-over to the operation required. The forge pan measures 12 in. by 14 in. The blower gearing runs silently and is speeded to produce a white heat for welding work, and it is detachable from the forge and can be mounted in front on the vice and used for the grinder and drill press. The grinder has three distinct speeds for light, medium, and heavy grinding, and the emery wheel is screwed on to the stud between the vice jaws attached to the high-speed gear on the gear box. Two substantial bearings, one on each side of the vice jaws, support the wheel, making for complete rigidity. The vice is accurately cut and two heavy shafts support the vice so that the jaws meet accurately. To convert this machine for drilling, the emery wheel is screwed off the shaft, and the anvil top placed at 90 deg. acts as a drill back. The standard drill-bit socket takes ¼-in. shank bits, but other sizes can be accommodated. The machine is handled in this country by BUCK & HICKMAN, LTD., 2, Whitechapel Road, E.1.



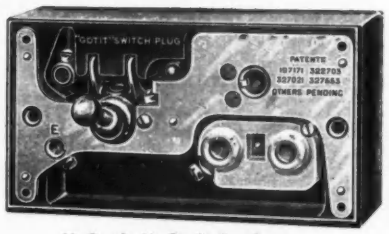
**"Champion" Repair Outfit**

### Vacuum Cleaner

The new British-made "Xcel" electric vacuum cleaner marketed by SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., 38 and 39, Upper Thames Street, E.C.4, is light in weight and designed to glide about on smooth polished runners. The special design of the turbines is claimed to result in very high efficiency with a motor speed lower than usual. An important feature is that the suction is practically as great when the dirt bag is nearly full as when it is empty. A large nozzle, 12 in. wide, enables any size of carpet to be dealt with speedily, and various other fitments are provided, each for a particular duty. The operation of the cleaner may also be reversed for blowing purposes. The cleaner is finished in polished aluminium and Royal blue cellulose enamel.

### Interlocking Switch-plug

It is claimed that until the advent of the "Gotit" switch-plug by A. P. LUNDBERG & SONS, LTD., Pioneer Electrical Works, 477 to 489, Liverpool Road, Holloway, N.7, a defect in all interlocking switch-plugs was that no ordinary B.E.S.A. plug could be used with them and that their use was limited to specially constructed plugs wherein one of the pins was mutilated in some way in order to obtain the interlock requirement. The "Gotit" has overcome the defect in a simple and efficient manner, and standard plugs can be used with it. This locking action is accomplished by means of a specially-designed hardened-steel cam which is kept in contact with the pin by a light spring. The periphery of the cam is of a gradually-increasing radius, and when an attempt is made to withdraw the plug, friction between the cam and pin revolves the cam into a definite locking position, caused by increased pressure of the pin against the wall of the socket tube, consequently the harder the pull the greater the pressure developed. The "locking" is released by an extension of the cam engaging with the "Kilarc" positive quick-make-and-break mechanism of the switch. This switch-plug, although rated at 15 A, 250 V, has been tested by Faraday House and dealt successfully with 25 A, 275 V d.c., and 6 A at 600 V d.c.

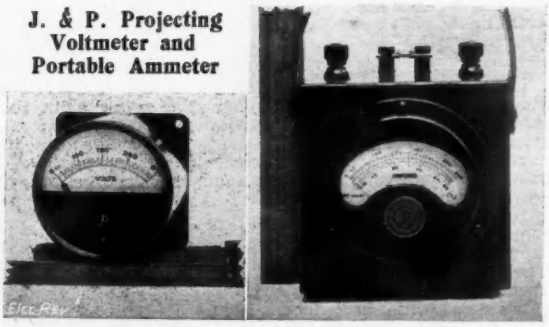



**"Gotit" Switch-plug**

### Small Ammeters and Voltmeters

JOHNSON & PHILLIPS, LTD., Charlton, S.E.7, have developed a new range of 3 in. to 4 in. round moving-iron and other ammeters and voltmeters with the idea of providing instruments of a small size to be as equally reliable as the larger instruments of 6 in. diameter and over generally used. The range includes 3-in. flush- and projecting-pattern voltmeters, 4-in. projecting ammeters and voltmeters which can also be supplied with moving-coil and hot-wire movements, a pocket-size portable m.c. ammeter, and a 3½-in. h.w. portable

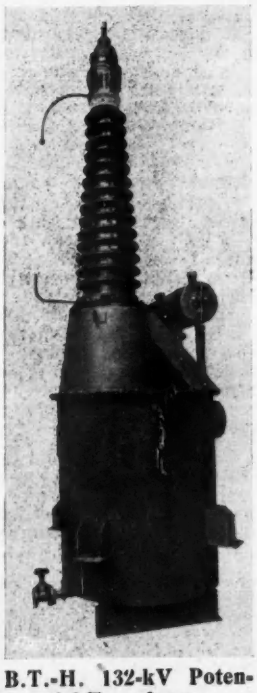
**J. & P. Projecting Voltmeter and Portable Ammeter**



ammeter. In the case of the projecting-pattern instruments the bases are practically square, and therefore less switchboard space is taken up than when the flange or base is of larger diameter than the top of the instrument. The instruments comply with the B.E.S.A. specification, and each is subjected to a pressure test of 2,000 V, a.c., for one minute. The cases are made of pressed steel, giving minimum weight and maximum strength, and the standard finish is bright-black stove enamel.

### 132-kV Potential Transformers

The accompanying illustration shows one of the 132-kV potential transformers in course of manufacture at the British Thomson-Houston Company's Rugby works. They are insulated to be stronger under impulse than a 41-in. gap in air, a bushing with a dry flashover of 380 kV at 50 cycles, or a string of line insulators having a dry flashover of 455 kV. Of the special features in design, one, protected by B.T.-H. patents, is a method of shielding, whereby transient overvoltages and switching surges are uniformly distributed throughout the winding and not concentrated on the end turns; this has been demonstrated by tests on the transformer illustrated.



**B.T.-H. 132-kV Potential Transformer**

Transformation ratio and phase angle characteristics are not only accurate but are maintained constant, as demonstrated by the fact that when supplied on the e.h.p. winding and connected to a burden of 200 VA, the inaccuracy does not exceed one per cent. in ratio and one degree in phase angle, whether tested at the rated voltage or at one-twentieth rated voltage.

The height from ground level to the bottom of the porcelain of the e.h.p. bushing is one inch over the Home Office requirement of 8 ft., the overall height being 15 ft. 3 in., and the weight, complete, 7,000 lb.

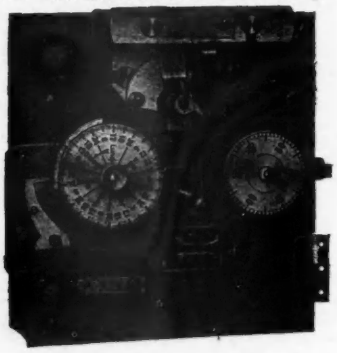
These e.h.p. potential transformers can also be supplied suitable for emergency lighting of sub-stations or similar duty. For this purpose the power rating of such transformers as the one illustrated would be 7.5 kVA.

### Small Pumping Outfit

There has been recently placed on the market by BOULTON AND PAUL, LTD., Norwich, a small self-contained electrically-driven pump known as the "Boulton" self-lubricating electric house pump specially designed for country-house work where electricity supply is available. The pump will deal with 260 gal. per hour at a total head of 80 ft., which includes a suction lift of 20 to 22 ft. It is driven by a ½-b.h.p. motor for either a.c. or d.c. The pump is of the double-acting type with a renewable brass liner. The valves are accessible and can be inspected without disconnecting the suction or delivery piping. In addition to the air vessel an interceptor is fitted to the suction side of the pump, so that the suction valves are always kept primed. The transmission end of the pump is totally enclosed and runs in an oil bath. When required, a float switch can be supplied for automatic starting and stopping. Automatic control can be arranged, and the overall dimensions are 27 in. by 10 in. The approximate current consumption is 1 kWh per 1,000 gal. pumped.

### Time-switch Improvements

Two new features in connection with their "Sauter" time switches have been introduced by NATHAN & ALLEN, LTD., 131, Victoria Street, Westminster, S.W.1. One is a device on the 40-day hand-wound time switches whereby while the clock is sealed so that the consumer cannot tamper with the setting, it is left to the consumer to wind the clock. Should a consumer fail to wind his clock by the 30th day it remains in the "off" position, thereby drawing his attention to the winding of the clock. If he leaves the switch unwound till the 33rd day, the winding mechanism is then locked and the consumer cannot rewind the clock and has to send for the supply authority's representative to unseal the clock, rewind, and if the clock has stopped, re-set it, thus protecting the supply authority from unscrupulous consumers.



**"Sauter" Time Switch; "Sunday" Dial Left**

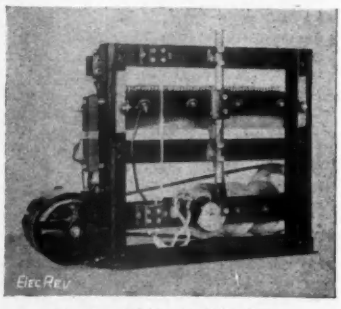
The second feature is the Sunday and holiday cut-out for time switches controlling heating installations where the peak load varies from day to day. A weekly dial works in conjunction with a 24-hour dial whereby it is possible to arrange for different periods of "off" and "on" on consecutive days in any one week. For example, after a week-end it is possible to arrange for the heating to come on earlier, say, on Monday morning, than on any other day of the week, and remain "off" during the week-end or odd days, or come on two or three times during the week at different periods.

### Special Induction Motor

The "Lokaveay" (low kVA) motor recently produced by the ELECTRIC CONSTRUCTION CO., LTD., 9, Kingsway, W.C.2, is a machine of very simple construction designed for high power factor at all loads. The feature of the machine is a simple type of stator winding which, although mechanically of the standard type, is so connected that it can be wholly or partially excited by a static condenser. This winding carries the current supplied by the mains; supplies power to the condenser at the correct voltage for the most efficient operation; acts as an exciting winding for the magnetising current supplied to the condenser; and takes the place of the ordinary auto-transformer, for starting purposes, when used with a "Lokaveay" s.c. motor. The bulk of the magnetising current required by the motor flows only between the condenser and the stator windings, and, as the mains are relieved of this load, the p.f. of the motor is high. The high p.f. is obtained without any increased losses, indeed, the motor may, it is claimed, have a higher efficiency than an ordinary machine with a low p.f.

### An Illuminated Sign

The "Liquidlite" sign is a recent introduction of STRAND AND INTERCHANGEABLE SIGNS, LTD., 24-28, Floral Street, Covent Garden, W.C.2. The actual visible portion of the sign may be of practically any type desired, for it is in the design of the flasher switchgear that the feature of the sign lies. Contact with a large number of contacts, staggered diagonally and looking rather like the teeth on a comb, is made by the contactor arm which is moved vertically up and down by the action of the eccentric cam at the bottom centre of the apparatus. This cam is driven through gear-wheels by an electric motor, the speed of which can be regulated. When the contactor arm reaches the top of the staggered contacts the small mercury switch is opened and the circuit is broken. The arm then returns to the bottom of its travel and the mercury switch completes the circuit just before the arm again makes contact. The staggered contacts are so arranged that the operation of the flasher is exceptionally smooth. Since the flasher lights single lamps—not single letters—consecutively, the light has the appearance of flowing with the ease and grace of running water.



**"Liquidlite" Flasher**

The flasher is suitable for use with any script or block writing signs, and can be supplied with either 50, 100, or 150 contacts, each of which will carry 40 W.

# Business and Industrial Notes

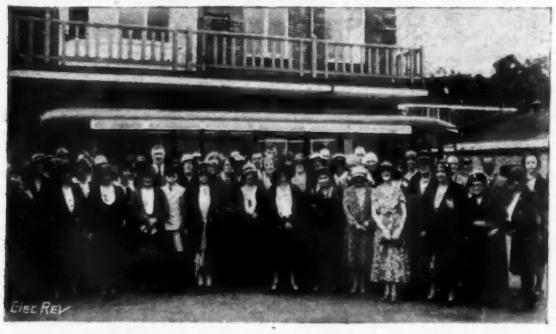
**The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures**

### Wages in the Electricity Supply Industry

At a meeting of the National Joint Industrial Council for the Electricity Supply Industry on June 26th, it was decided that the existing scale of wages, which had been stabilised until June 30th, should be continued until the end of July. The employers had asked for a reduction of 1d. per hour while the employés had given notice to terminate the sliding-scale agreement. In the meantime the question is to be referred back to the thirteen District Councils for consideration and settlement if possible.

### Visit to Ediswan Cable Works

The Bristol and District branch of the Electrical Association for Women made the cable works of the Edison Swan Cables, Ltd., at Lydbrook, the venue for its summer outing this year. After lunch at the "Speche House" Hotel, where the party was joined by Mr. F. Gale, works manager of the cable works, and Mr. J. L. Lovell, manager of the Bristol branch, they proceeded through the Wye Valley to the cable works. Here the



**Members of the E.A.W. at the Ediswan Works**

party was divided into small bands, and after a tour of inspection, tea was provided by the company in its staff dining hall. On the return journey a stop was made at the famous Symond's Yat.

### Social Event

The CLESCO (County of London Electric Supply Company, Ltd.) Sports and Social Club held its annual sports meeting on its ground at Raynes Park on June 27th. A very large gathering enjoyed a long series of events. The "Sir Harry Renwick" Challenge Cup for the highest points in all team events was won by the City Road sub-station. Miss Greenwell, the daughter of Sir Bernard Greenwell, Bart., presented the prizes.

### Engineers and Advertising

The *Daily Telegraph* reports that at last week's convention of the Advertising Association, Mr. Sam Mavor (managing director of Mavor & Coulson, Ltd.), addressing the "Sales Management" Section on the problems of distribution from the point of view of the manufacturer, said that British manufacturing engineers were probably the most backward of the important industries with regard to the character of their advertising. Many engineers whose products were of first-rate quality thought that quality ought to sell them. As everybody else knew, that was not true. Prospective purchasers must be informed of the merits of the product if a business was to be expanded.

### The B.E.A.M.A. Index

The B.E.A.M.A. Index of Activity gives a figure of 83.1 for May (1924=100), as compared with 79.9 for April and 110.4 for May, 1930. There was a decline in electricity production from 171 in April to 153 in May (on the 1924 basis). The figure for May, 1930, was 164.

### An Australian Tariff Application

A Melbourne firm of electric lighting fittings makers has applied to the Commonwealth Tariff Board for the imposition of increased duties on the class of goods with which it is concerned. The existing rates are 35 per cent. *ad valorem* under the British preferential tariff, 40 per cent. under the intermediate tariff and 45 per cent. under the general tariff. The applicants ask for these duties to be increased to 45 per cent., 55 per cent., and 60 per cent., respectively. At a recent inquiry a representative of the applicants said that they were unable to compete with the standard, cheaper types of fittings which were imported, although they had obtained substantial contracts for special fittings. The application was opposed by the British General Electric Co., Ltd., for whom it was stated that the range of lighting fittings was so large and the demand for any one type so small that it was impossible to manufacture them economically in Australia. The Board, after hearing evidence decided to continue the inquiry in Sydney.

### Methods of Trading with the Netherlands

A confidential memorandum on methods of trading, terms of payment, and the appointment of agents in the Netherlands, has been prepared from information furnished by the Commercial Secretary to H.M. Legation at the Hague, and issued to firms whose names are entered on the special register of the Department of Overseas Trade. British firms desirous of obtaining a copy of the memorandum should apply to the Department at 35, Old Queen Street, London, S.W.1. Reference No. C.X. 3575 should be quoted.

### Trade Commissioner's New Durban Offices

The Department of Overseas Trade announces that Mr. S. R. Jordan, who has been serving temporarily as H.M. Trade Commissioner at Johannesburg since February last and who has been appointed as Trade Commissioner at Durban, will open the new office at Durban on July 1st. Communications intended for Mr. Jordan should be addressed as follows:—H.M. Trade Commissioner, P.O. Box 2211, Salisbury House, Smith Street, Durban, Natal. The telegraphic address is "Austere, Durban."

### The "Tote" at Ascot

With reference to the article on this installation, which appeared in our last week's issue, we are informed that the British Thomson-Houston Co., Ltd., was the main contractor to the Racecourse Betting Control Board for the totalisator at Ascot. This company was also main contractor and part manufacturer to the R.B.C.B. for the all-electric totalisators at Newmarket, Leicester, Pontefract, Wolverhampton, Birmingham, and Cheltenham. The B.T.-H. Co. is the main contractor for a maintenance and operation contract covering these courses.

### Commercial Diplomatic Changes

Sir J. J. Broderick, K.B.E., C.M.G., until recently Commercial Counsellor at Washington, left the United States on June 11th to take up his appointment as Minister at Havana, and Mr. H. O. Chalkley, C.M.G., C.B.E. (formerly Commercial Counsellor at Buenos Aires), has succeeded Sir John Broderick as Commercial Counsellor at Washington from the same date.

### Britannia Batteries at the C.E.A. Exhibition

A prominent part was taken at the Cinematograph Exhibitors' Association Exhibition held at Brighton by BRITANNIA BATTERIES, LTD. A complete range of batteries of all types and for all purposes was shown, including "Britannia" batteries of the lead-acid type, both stationary and portable, "Fenica" nickel-iron alkaline cells, and "Pertrix" dry batteries. The exhibits also included specimens of "Britannia" stationary cells, as used for maintaining the lighting or power supply in kinemas in the event of failure of the supply from the mains.

### The E.D.A. at the Highland Show

Through the co-operation of the British Electrical Development Association with the Edinburgh Corporation Electricity Department, the Lothians Electric Power Co., and the Scottish Southern Electric Supply Co., an all-electric exhibit was shown for the first time at the Highland and Agricultural

**An E.D.A. Display at Edinburgh**

Society's Centenary Show held at Edinburgh last week. Electrically-driven appliances of special interest to the rural and farming community were displayed, including a milking machine, chaff cutter, and root grinder, sheep shearer, lawn mower, water pump, churn, cream separator, and bottle washer, as well as a wide range of domestic appliances.

### Group Life Assurance

We have received from the Colonial Mutual Life Assurance Society, Ltd., 4, St. Paul's Churchyard, E.C.4, a booklet giving particulars of a typical group assurance scheme arranged by the society. This provides, for small weekly contributions, capital sums at the age of 65, or earlier death or permanent total disablement. Provision is made for employés who leave the service of the company which has adopted the scheme.

## Trade Announcements

The address of the factory and offices of VENNER TIME SWITCHES, LTD., is now Kingston By-Pass Road, New Malden, Surrey (telephone number, Malden 1551).

Messrs. BUCK & HICKMAN, LTD., have found it necessary to remove their Manchester branch to more commodious premises at 277, Deansgate, Manchester. The new premises have a total floor space of 2,200 sq. ft.

The SERVICE ELECTRIC CO., LTD., 243, Great College Street, N.W.1, informs us that Mr. J. A. Hartigan has relinquished his position with the company.

The London address of ASTER, LTD., is now Dering House, Dering Street, Bond Street, W.1. Telephone: Mayfair 4131/2; telegraphic address: "Asterenge, Phone, London."

The sales of Siemens "Full-o'Power" radio batteries are now directed from the London offices of SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD., 38/39, Upper Thames Street, E.C.4.

As from July 6th the trade counter of PHILIPS LAMPS, LTD., will be moved to 145, Charing Cross Road, W.C.2 (entrance in George Yard).

STRAIGHT-LITE REFLECTORS, LTD., has removed to 73, Canonbury Road, N.1. (Telephone: North 5294; telegrams: "Lytreflect, Nordo, London.")

## For Sale

Merton and Morden Urban District Council has for disposal generating plant and electric vehicles.

(See our advertisement pages to-day.)

## Power Station Staffs' Salaries

In our issue of July 25th last year we reproduced the National Joint Board schedule of salaries for the staffs of electricity supply undertakings as it then stood. Those rates remained in force up to the end of June. Owing to the continued fall in the cost of living during the past year these rates have now been revised. The amended schedule, which takes effect as from July 1st and is reproduced herewith, represents a deduction of 15 points from the basic salaries fixed in 1923. It should be noted that employés in the London area are entitled to a 5 per cent. addition to the schedule rates; also that in any district where conditions justify a lower remuneration, a deduction of 5 per cent. can be made by mutual agreement.

| Title of Grade. | Grade. | Class A 1,000—2,000 | Class B 2,001—4,000 | Class C 4,001—6,000 | Class D 6,001—8,000 | Class E 8,001—13,000 | Class F 13,001—25,000 | Class G 25,001—50,000 | Class H 50,001—100,000 | Class J 100,001 and over. |
|---|---|---|---|---|---|---|---|---|---|---|
| Deputy Chief Official... ... ... | 1 | £466 2 0 | £500 6 0 | £548 15 0 | £579 3 0 | — | — | — | — | — |
| | 2 | 402 9 0 | 431 18 0 | 474 13 0 | 502 4 0 | £544 0 0 | — | — | — | — |
| Power station supt. Mains supt. (with charge of sub-station). | 3 | 360 13 0 | 387 5 0 | 428 2 0 | 451 17 0 | 490 16 0 | £510 15 0 | £548 15 0 | £591 10 0 | £650 8 0 |
| Mains supt. (without charge of sub-station). | 4 | 307 9 0 | 341 13 0 | 365 8 0 | 400 11 0 | 433 16 0 | 452 16 0 | 501 5 0 | 535 9 0 | 579 3 0 |
| | 5 | 289 8 0 | 314 2 0 | 345 9 0 | 366 7 0 | 396 15 0 | 429 1 0 | 447 2 0 | 491 15 0 | 521 4 0 |
| | 6 | 260 18 0 | 291 6 0 | 312 4 0 | 341 13 0 | 359 14 0 | 389 3 0 | 416 14 0 | 445 4 0 | 487 19 0 |
| | 7 | 234 8 0 | 260 18 0 | 291 6 0 | 307 9 0 | 334 1 0 | 360 13 0 | 374 18 0 | 414 16 0 | 438 11 0 |
| Shift charge engineer ... ... | 8 | 234 8 0 | 234 8 0 | 260 18 0 | 286 11 0 | 301 15 0 | 327 8 0 | 350 4 0 | 363 10 0 | 398 13 0 |
| | 8a | 217 12 0 | 217 12 0 | 238 8 0 | 260 18 0 | 278 0 0 | 301 15 0 | 323 12 0 | 338 16 0 | 369 4 0 |
| | 8b | 201 12 0 | 201 12 0 | 220 0 0 | 236 16 0 | 254 5 0 | 277 1 0 | 297 0 0 | 315 1 0 | 340 14 0 |
| | 9 | — | — | 201 12 0 | 216 0 0 | 232 16 0 | 252 7 0 | 271 7 0 | 291 6 0 | 312 4 0 |
| | 9a | — | — | — | 201 12 0 | 216 16 0 | 225 12 0 | 239 4 0 | 258 1 0 | 279 18 0 |
| | 10 | — | — | — | — | 201 12 0 | 201 12 0 | 212 16 0 | 227 4 0 | 248 11 0 |
| | 10a | — | — | — | — | — | — | 201 12 0 | 216 0 0 | 232 0 0 |
| | 10b | — | — | — | — | — | — | — | 201 12 0 | 216 0 0 |
| | 10c | — | — | — | — | — | — | — | — | 201 12 0 |

## Recent Contracts

Messrs. YARROW & CO., LTD., have received an order for two of the latest type of water-tube land boilers, with superheaters, economisers, and mechanical stokers, which are being supplied through Messrs. Guest, Sykes, Ltd., Johannesburg, to the Government of Northern Rhodesia for the new electricity undertaking at N'Dola.

Messrs. RUSTON & HORNSBY, LTD., have received an order from A.R.P. Studios Ltd., London, for three vertical oil engines totalling 1,425 b.h.p. These are six-cylinder engines using cheap fuel oils and working on the Ruston principle of airless injection. Two are of 600 b.h.p. and the third of 225 b.h.p., and they will generate the electricity required for the new Ealing "talkie" studios.

An order to the value of £120,000 has been placed by the Nottinghamshire and Derbyshire Electric Power Company with the British Thomson-Houston Co., Ltd., Rugby. This is for a 30,000-kW turbo-alternator set and condensing plant.

The ALTON BATTERY CO., LTD., has been awarded a contract covering all the batteries for the new B.B.C. Scottish regional station. Thirteen batteries are to be provided, ranging in capacity from 10 to 2,000 Ah, the latter to comprise 115 cells.

STANDARD TELEPHONES & CABLES, LTD., has received an order from the Italian Telegraph Administration for repeater equipment to be used on the new submarine cable between Italy and Sardinia. The company has also obtained an order from the General Post Office for the power plant for Stranraer repeater station. This station will ultimately be the linking-up point for the transatlantic telephone cable.

## Electrical Activities at the Three Shires Show

The Shropshire, Worcestershire and Staffordshire Electric Power Co., and the South Wales Electrical Power Distribution Co. figured very prominently at the Three Shires Agricultural Show held at Hereford last month. The combined stand of the two companies occupied a very conspicuous position in the show-ground and displayed every type of domestic appliance, as well as examples of electrical apparatus of particular interest to the agriculturalist. An illustration appears on p. 13 of this issue. On the right-hand side of this is seen a small model dairy in which demonstrations were given throughout the Show, while in the centre are a refrigerator, cooker, and washing-machine such as might be used in farmhouses. A little to the left of this is shown a poultry-plucking machine, which caused a great deal of interest on account of the speed with which it could remove the feathers of poultry compared with hand-operation. A small portable saw was also demonstrated cutting up a tree trunk. On the extreme left of the exhibit was displayed the standard pull-down 11,000-V line tapping arrangement employed by the two companies for supplies to the smaller villages, hamlets, and individual farms, and on the other side of the stand was a complete egg-grading machine in operation and several specimens of typical electrically-driven machines for crushing, grinding, and cutting agricultural produce.

## New Catalogues and Lists

EVERETT, EDGCUMBE & CO., LTD., 117, Victoria Street, Westminster, London, S.W.1.—A catalogue, describing the "Synclock" all-mains electric clock.

M. W. WOODS, LTD., 46, Kingsway, London, W.C.2.—Catalogue No. F.131, containing particulars of the new season's "Windifan" electric fans.

The IGRANIC ELECTRIC CO., LTD., 149, Queen Victoria Street, London, E.C.4.—Leaflet 190, dealing with automatic motor starting pillars in ironclad split housings.

The EQUIPMENT AND ENGINEERING CO., LTD., 2 and 3, Norfolk Street, Strand, London, W.C.2.—A leaflet, giving details of vacuum cleaning plants for public service vehicles and garages or depôts.

BEST & LLOYD, LTD., Cambray Works, Handsworth, Birmingham.—An illustrated booklet of modern lighting fittings.

MARCONI'S WIRELESS TELEGRAPH CO., LTD., Marconi House, Strand, London, W.C.2.—Leaflets 1132 and 1133 relating respectively to the "Marconi-Adcock" direction finder and the "Marconi" combined long- and short-wave telegraph-telephone transmitter.

BROOKHIRST SWITCHGEAR, LTD., Northgate Works, Chester.—A leaflet referring to "Brookhirst" a.c. automatic motor-control panels.

W. T. GLOVER & CO., LTD., Trafford Park, Manchester.—A brochure containing illustrations of some of the buildings wired with cables of the company's manufacture.

BATTERIUM METAL & VISLOK, LTD., Market Harborough.—A leaflet giving results of tests made on "Batterium" metal.

The EDISON SWAN ELECTRIC CO., LTD., 123-5, Queen Victoria Street, London, E.C.4.—Publications dealing with "Ediswan" moulded suspension switches and the "Junior" H.O. distribution boards.

## Book Notices

"Electric Wiring Tables," 6th edition, 1931. Price 3s. 6d. net. By W. Perren Maycock, M.I.E.E., revised by F. Charles Raphael, M.I.E.E. London: Sir Isaac Pitman & Sons, Ltd.

"Artificial Resins," by Johannes Scheiber and Kurt Sändig.—Translated from the German by Ernest Fyleman. Pp. vii+445; figs. 29. London: Sir Isaac Pitman & Sons, Ltd. Price 30s. net.

"Efficiency Without Smoke."—In this booklet issued by Judd, Budd, Ltd., much useful information is given as to the correct design of flues, &c., and the firing conditions necessary for the efficient combustion of fuel.

"Cross Country Flying," by Major Oliver Stewart. Pp. ix+116; illustrated. London: Constable & Co., Ltd. Price 6s. net.

"Tables and Memoranda for Plumbers, Builders, Sanitary and Electrical Engineers, &c.," by J. Wright Clarke; seventh edition (revised and enlarged). London: B. T. Batsford, Ltd. Price 2s. 6d. net (with celluloid case, 3s. 6d.).

"Standardised Designs for Overhead Distribution and Transmission Lines." This brochure has been prepared by the members of the Cable Research Committee on whose behalf it is being distributed by Commercial Secretaries, Ltd., Cable Research House, Silver Street, W.C.1.

## Prices of Materials

Messrs. F. Smith & Co. report June 30th: Copper (electrolytic) bars, sheets and wire rods, no change; ditto, ditto, h.c. wire, 7¼d., ¼d. increase.

## New Electrical Showrooms

Following the amalgamation of Newtons of Taunton and T. Harding Churton & Co. (ELEC. REV. May 1st, p. 750), new London offices and showrooms have now been opened at 3, Cavendish Place, Regent Street, W.1. On the ground floor besides offices for the staff is a large and airy reception room in which are displayed representative examples of electric motors, battery chargers, &c. Particular attention has been paid to facilities for the demonstration of apparatus and a special department has been provided for showing in operation the company's garage equipment and smaller electrical plant. In the illustration appearing above can be seen a corner of this demonstration room in which are displayed typical examples of battery charging and testing equipment, air compressors, electric motors and repair tools.

**A Corner of the Demonstration Room**

## " Efesca " Cookers

In the forecast of the exhibits at the I.M.E.A. Convention at Scarborough in our issue of June 12th the " Efesca Minor," one of the new cookers introduced by Falk, Stadelmann & Co., Ltd., was referred to as being fitted with two solid boiling plates. This is incorrect, the cooker has one solid boiling plate and one dual-purpose plate for grilling and boiling.

## Architects Visit Shannon Works

A party of thirty architects, who had been attending the Architects' Conference in Dublin, recently paid a visit to the Shannon Scheme works at Ardnacrusha. They were shown over the undertaking by Mr. T. P. O'Connor, resident engineer. Included in the party were Mr. F. G. Hicks, president of the Conference; Mr. McGilleray and Mr. Whiteside, president and hon. secretary, respectively, of the Institute of Southern Rhodesia Architects; and Mr. Walker, of the Institute of American Architects.

## The B.I. Cable Film

A large number of persons were present at the New Scala Theatre, London, on June 25th, when a film prepared by British Insulated Cables, Ltd., was shown demonstrating the company's methods of cable manufacture and research work. The film, which has been produced primarily to assist sales abroad, illustrates in an attractive and lucid manner the whole process of modern cable production and opens with a set of progress diagrams indicating the various stages in the manufacture of a paper-insulated cable. Next is shown an aerial view of the Prescot works followed by a photographic tour of the principal departments of the works. After a brief visit to the Helsby works, where the company's rubber-covered cables are produced, a demonstration is given of the B.I. method of trenching, laying and jointing 11-kV cables. Overhead line work is then dealt with and views are given of a portion of the 250 miles of line being constructed by the company in connection with the Central Scotland Electricity Scheme. A map of the world, showing centres of B.I. activity, concludes the film. The film was also shown in Birmingham on Tuesday when the audience included Mr. E. S. Jennings, secretary and manager of the Birmingham Electricity Supply Department.

## Rationalisation and Displaced Labour

This was the subject referred to a committee by the National Industrial Alliance about a year ago, and we have received a copy of that committee's report which has just been issued. This endeavours to define the meaning of the word " rationalisation " and states that witnesses from seven prominent industrial concerns gave evidence. Mr. W. L. Hichens contributed an address containing his views which he had delivered before the Manchester Statistical Society. It is regretted that it was impossible to secure evidence from representative trade unions, but reference is made to the " Mond-Turner " memorandum. The evidence is summarised and treated under a number of headings. One of the most interesting sections is that setting forth schemes for the compensation of displaced employés. The committee concludes that rationalisation is " inevitable "; that rationalisation reduces costs and displaces labour; that something should be done to safeguard those who are displaced; that if rationalisation is to be carried out without undue difficulty, there should be the closest consultation and co-operation between the management and productive, distributive and administrative sections; and that a fair proportion of the benefit of rationalisation should be reflected in lower prices to the consumer. The report (price 3d.) can be obtained from the National Industrial Alliance, 42, Broadway, S.W.1.

## Increases in Italian Duties

Cables and accumulators are among the articles affected by tariff increases enforced by the Italian Government as from June 18th. These increases are not, however, of considerable dimensions.

## Newfoundland Tariff Reduction

The Newfoundland Government proposes to reduce the duty on electric batteries (primary and secondary) from 50 per cent. to 40 per cent. *ad valorem*.

## German Companies Negotiations

The Berlin correspondent of the *Financial Times* reports that negotiations are practically concluded between the Siemens groups, the A.E.G., and others whereby Siemens and the A.E.G. will jointly control the Maffei-Schwartzkopff Werke, which is mainly concerned with the manufacture of electric locomotives.

## New Municipal Showrooms

New electricity showrooms in the Market Place, Eccles, established by the Town Council, were opened on June 30th by the chairman of the Electricity Committee, and on the following day the premises were opened for public inspection.

## Hammersmith's New Showrooms

After a history of progress extending over nearly forty years Hammersmith Electricity Department made another step forward last Friday when " Electric House," its handsome new showrooms and head offices at 154, Uxbridge Road, W.12, were opened by Mr. W. F. Marchant, chairman of the London and Home Counties Joint Electricity Authority. The new building, which comprises three storeys, is situated in the centre of one of the main thoroughfares at Shepherds Bush and is easily accessible from all parts of the borough. On the ground floor at the front is a showroom measuring 50 ft. by 34 ft. (shown below) wherein is displayed every type of modern electrical apparatus. Almost the whole of one side is devoted to cookers, on the other being examples of smaller appliances such as fires, kettles, toasters and irons; in addition there is a very comprehensive display of lighting fittings. At the rear is another smaller showroom specially equipped as a kitchen for the demonstration of cookers, irons, wash boilers, washing machines, &c. A cashier's counter is provided in the oak-panelled entrance hall for the payment of accounts. On the first floor are the offices for the technical and clerical staffs together with a large public lecture room. The second floor contains a telephone exchange, drawing office, salesmen's room and stores. The basement will be used for stores. The General Electric Co., Ltd., was responsible for the permanent lay out of the electrical fittings and the decoration of the showrooms, the electrical installation being carried out by Messrs. Twentyman & Willmott.

**An Interior View of " Electric House " at Shepherds Bush**

### Company Liquidations

W. H. LAWTON, LTD.—Winding up voluntarily. Joint liquidators: Mr. F. E. Bendall, 26, Corporation Street, Birmingham, and Mr. M. P. Ferneyhough, 6, Commerce Street, Longton, Stoke-on-Trent.

MASON (ELECTRO-MEDICAL), LTD.—Particulars of claims by July 25th to the liquidator, Mr. H. A. Snelling, 24, Essex Street, W.C.

ELECTRODUCER, LTD.—Meeting, July 30th, at 127-130, Moorgate Station Chambers, E.C., to receive an account of the winding up by the liquidator, Mr. C. A. G. Henson.

BEL-CANTO RADIO, LTD.—Particulars of claims by July 31st to the liquidator, Mr. R. S. Andrews, 448, Strand, W.C.

### Bankruptcy Proceedings

R. E. LOMAS, electrical and radio engineer, trading as R. E. Lomas & Co., 24, Tower Street, King's Lynn, Norfolk.—The first meeting of creditors was held on June 26th at the Court House, King's Lynn. According to the statement of affairs submitted there were liabilities of £558, against assets of £132. after deducting preferential claims of £20, leaving a deficiency of £426. The debtor attributed his position to "cessation of wiring contract in July, 1930, bad debts, keen competition, and depreciation in value of stock."

J. & M. LAZARUS, wireless and electrical dealers, trading as Langdon's Radio, 13, Craven Park Road, Willesden.—A sitting of the London Bankruptcy Court was appointed to be held on June 26th before Mr. Registrar Mellor for the public examination of these debtors. The receiving order was made on April 22nd upon a creditor's petition and an order of adjudication in bankruptcy followed on May 1st. The failure was attributed to trade depression, lack of capital, heavy overhead expenses and severe competition. Mr. H. Wheeler, Assistant Official Receiver, reported that no statement of affairs had been lodged. Criminal proceedings had been taken against the debtors and they were stated to be under remand on a charge of obtaining goods by false pretences. The examination was adjourned till July 17th.

P. W. OTTOWAY, wireless dealer, trading as "The Victor Radio Supplies," 73, late 106, Victor Street, Great Grimsby.—The receiving order was made on May 29th on the debtor's own petition. According to the statement of affairs there are liabilities amounting to £241 against assets of £27. The first meeting of the creditors was held recently at the Official Receiver's office, St. Mary's Chambers, Great Grimsby, when the case, being a summary one, was left in the hands of the Official Receiver as trustee of the estate.

G. W. BROWN, electrical engineer, 57, Skirbeck Road, Boston, Lincolnshire.—Discharge granted June 25th.

A. S. DEACON, wireless dealer, trading as The London Wireless Co., 32, London Road, Derby, and 127, Pear Tree Road, Derby.—The public examination was held on June 23rd at the Court House, 20, St. Peter's Churchyard, Derby. According to the statement of affairs submitted, there were liabilities amounting to £2,092 against assets of £474. Debtor attributed his failure to inexperience, bad trade and heavy expenses. He added that unemployment in the district had affected his business and in 1929 he had to borrow money from his father. He had disposed of a branch shop at Burton for £225. The examination was concluded.

A. PARSONS, electrician, 23, Clifton Crescent, South Rotherham, late of 25, High Street, Rotherham.—The examination of this debtor was held on June 25th at the County Court, Bank Street, Sheffield. According to the statement of affairs submitted, there were liabilities of £221 and assets of £21. The debtor attributed his position to loss on a showroom venture. The examination was closed.

H. EVANS, electrical factor, 60, Berners Street, W.—Receiving order made June 19th on a creditor's petition. First meeting held July 2nd, and public examination, September 8th, both at Bankruptcy Buildings, Carey Street, W.C.2.

J. E. DAWSON, wireless engineer, High Street, Boston.—Discharge suspended for six months until November 28th.

W. F. O SEWELL (Commercial Electrical Co.), electrical engineer, 24, James Street, Bradford.—First and final dividend of 3s. 7d. in the £, payable June 27th at the Official Receiver's office, 12, Duke Street, Bradford.

H. F. SPENCE (Spence & Sons), electrical engineer, 2, Eureka Terrace, Honiton.—First and final dividend of 11½d. in the £, payable July 1st at the offices of Edward Thomas Collins and Son, 28, Baldwin Street, Bristol.

H. C. ROBINSON, electrical engineer, 68, Military Road, Colchester.—Receiving order made June 22nd on debtor's own petition.

W. H. SAYER, electrical engineer, 14, Rectory Road, Beckenham.—First meeting, July 7th, at 29, Russell Square, W.C. Public examination, July 30th, at the County Court, Scarbrook Road, Croydon.

A. J. HODGES, electrical engineer, 4, Binswood Street, Leamington Spa.—Receiving order made June 20th on debtor's own petition.

R. L. BROCK (R. L. Brock & Co.), electrical engineer, 5, Bedford Row, Tavistock Road, Plymouth.—Trustee, Mr. J. S. B. Hole, 240, High Holborn, W.C., released April 21st.

H. G. EDGHILL, electrical and wireless engineer, 13, Wembley Hill Road, Wembley.—Last day for receiving proofs for dividend, July 10th. Trustee, Mr. J. L. Poland, 29, Russell Square, W.C.

# Electricity Supply

## Lighting, Domestic, Power

**Argentina.**—HYDRO-ELECTRIC DEVELOPMENT.—A message from Buenos Aires states that the Argentine Government has under consideration a hydro-electric scheme to utilise the waters from the mountainous part of Mendoza, which contains some of the highest summits of the Andes. It is known that several rivers, now running to waste, could be effectively harnessed to provide a large volume of power, and the chief engineer of the Ministry of Public Works has expressed his willingness to co-operate and recommend the granting of concessions for the development of several favourable sites. A Bill is also to be submitted to Congress recommending the construction of a hydro-electric plant in the province of Tucumán; this includes two 10,000-h.p. stations and an irrigation dam on the Rio Sali, and a 10,000-h.p. plant on the Marapá. The town of Rio Cuartohas has applied to the provincial legislature for the installation of a hydro-electric plant.—*Reuter's Trade Service* (Buenos Aires).

**Australia.**—VICTORIAN ELECTRICITY COMMISSION.—A loss of £13,672 for the quarter ended March 31st on the activities of the State Electricity Commission—the first loss for three years—is due mainly to the high rate of exchange. This will cost the Commission an additional £70,000 during the current year. As a result, it is feared that there will be a loss at the end of the year, whereas a normal exchange rate would have enabled the Commission to balance its accounts, despite increased interest charges and a falling load. The output for the quarter was 96,689,505 kWh, a decrease of about 6 per cent., as compared with the corresponding period last year.

**Barking.**—ASSISTED WIRING.—The Urban District Council Electricity Committee is preparing a scheme for the hire and hire-purchase of electrical installations.

MAINS EXTENSIONS.—Mains are to be extended to supply electricity to the premises of the Neuchatel Asphalte Co., Ltd., in River Road.

**Brighton.**—YEAR'S WORKING.—The Corporation electricity undertaking shows very satisfactory results for the twelve months ended March 31st last. The revenue amounted to £326,066, which represents an increase of 16½ per cent. over the previous year, the gross profit being £158,380. After providing for capital and other charges, there was a net surplus of £38,670. At the close of the financial year the consumers numbered 24,383, an increase of 2,831.

**Burnley.**—CHANGE-OVER.—The Corporation Electricity Committee proposes to apply for sanction to a loan of £25,000 to meet expenditure in connection with the change-over from d.c. to a.c. in various districts. The conversion is also proposed under an unemployment scheme of certain other districts at a cost of £47,075, and further borrowing powers are required to cover the cost.

**Carlisle.**—YEAR'S WORKING.—We have received from Mr. C. W. Salt, city electrical engineer, a copy of his annual report together with a statement of accounts of the Electricity Department for the year ended March 31st last. The total revenue showed an increase from £96,091 to £101,947, the working expenditure also rising from £50,749 to £53,397. The gross profit amounted to £48,550, as against £45,342 in the preceding year, and to it was added an unemployment grant of £6,496 making a total of £55,046 available. After providing for loan charges (which showed a considerable increase), there was a net loss of £7,325, as compared with a net profit of £1,968 in 1929-30. The capital expenditure during the year amounted to £58,432, the principal items being £26,683 for machinery and £18,605 for mains. The total now spent on the undertaking stands at £788,873. Sales of electricity increased from 13,995,547 to 17,668,773 kWh and the maximum load from 7,200 to 8,700 kW. The average price obtained fell from 1.65d. to 1.59d. During the year under review large additions were made to the generating station, including the installation of a main generating unit of 15,000-kW capacity and three additional steam-raising units. A commencement was also made of the development of the Corporation's added area of supply and other large extensions of the distribution system within the city.

**Chile.**—ELECTRICITY SCHEMES.—An agreement has been reached between the Municipality of Valparaiso and the Compania Chilena de Electricidad (a British enterprise owning hydro-electric plants at La Florida, Maitenes, Los Morros, and Penmeles forming the largest generating system in Chile), which will provide an all-round improvement and considerable extension of the city's public lighting, together with a reduction in electricity charges. The agreement provides for the erection by the company, in or near Valparaiso, of a thermo-electric plant of 60,000 h.p. primarily intended for the province of Aconcagua. The company will in due course extend its services to Santa Rosa de los Andes. It is expected that larger sales of electrically-operated labour-saving devices will ensue, and that the market for electrical appliances generally will be extended considerably.—*Reuter's Trade Service* (Valparaiso).

**Continental.**—ITALY.—A special consultative committee has recently been appointed by the Italian Ministry of Public Works to encourage the use of electricity for agricultural purposes in Italy.

FRANCE.—Further progress was made during last year in the connecting-up of the various transmission systems in the Paris area. During the twelve months about 60 miles of new 60,000-V and 40 miles of 12,000-V cables were installed, and four

additional 60,000-V sub-stations were brought into operation. Work is now in hand on the construction of two new 60,000-V linking-up stations—one near St. Ouen and one at Issy-les-Moulineaux.

BELGIUM.—The Comité Electrotechnique Belge, of Brussels, has recently appointed a special commission to inquire into and report upon the measures to be taken to popularise the use of domestic electrical appliances in Belgium.

**Coventry.** — GRID SUPPLY. — The electrical engineer has received an assurance from the Central Electricity Board that the grid supply to Longford generating station will be available by about the end of October next.

EXTENSIONS.—The Corporation Electricity Committee is to provide an electricity supply to Baginton.

**Cullompton (Devon).** — PUBLIC LIGHTING. — The Parish Council has decided to invite tenders for public lighting by both gas and electricity.

**Dorchester.**—LOANS.—The Corporation Electricity Committee is to apply for sanction to loans of £1,000 for mains and £900 for services.

**Dundee.**—YEAR'S WORKING.—The revenue of the Corporation Electricity Department for the past year amounted to £236,800 and the expenditure to £126,273. Slight reductions in the charges for electricity are proposed.

**Fleetwood.**—LOAN.—The Urban District Council is applying for sanction to the borrowing of £10,000 for the installation of three rotary convertors at the electricity works.

**Glasgow.**—PROGRESS DURING MAY.—Under the Corporation Electricity Department's scheme 765 houses were wired during May, bringing the total to 32,448, while hired appliances numbered 21, making the total 20,807.

MAINS EXTENSIONS.—The Corporation Electricity Committee recommends the laying of distributing mains at a cost of £555.

SCHOOL INSTALLATIONS.—The Corporation Education Committee is to install electric lighting, bells, and clocks at 16 schools.

**Hitchin.** — ELECTRICITY CHARGES. — The Urban District Council, which recently acquired the electricity undertaking, has fixed flat rates of 7d. per kWh for lighting and 2d. per kWh for heating.

**Hornsey.**—MAINS EXTENSIONS.—The Corporation Electricity Committee is to extend mains at a cost of £2,000.

**Japan.**—NEW POWER STATIONS.—The Mima Hydro-Electric Co. proposes to erect another hydro-electric power station on the Iyo River. The development of 23,000 kW of hydro-electric energy on the Yeno River is also proposed by the Dai Nippon Electric Power & Sulphate of Ammonia Co., Ltd.

**Littleborough.**—LOANS.—The Urban District Council Electricity Committee recommends that application be made for sanction to the borrowing of £2,830 for the provision of underground mains and £1,000 for the purchase of domestic electrical apparatus.

**London.**—FULHAM.—The accounts of the Borough Council Electricity and Lighting Committee for the year ended March 31st last show a total revenue of £162,073 and a working expenditure of £41,900, leaving a gross profit of £120,173. After deducting capital and other charges there was a net surplus of £25,597, of which £6,375 was transferred to the relief of rates. Electricity sold amounted to 23,283,438 kWh, the average price obtained being 1.591d. per kWh, as against 1.562d. in the previous year.

**Luton.**—EXTENSIONS.—The Town Council has adopted further schemes for extending its rural electricity supply and has applied for sanction to a loan of £14,294 for the work. The extensions are to be to Roe End, Kensworth, Wing, Harlington, Westoning, Tilsworth, Stanbridge, Flitwick, Mentmore, Cheddington and Horton.

**Madagascar.**—HYDRO-ELECTRIC DEVELOPMENT.—The second hydro-electric power station at Antelomita on the River Varahina has recently been completed by the Société d'Electricité et Eaux de Madagascar and is now supplying power to Antananarivo. Work is also well in hand on the construction and equipment of a hydro-electric station to utilise the Volobe Falls for the supply of power to Tamatave and eventually for the working of the railway between Antananarivo and the coast.

**Maidstone.**—LOANS.—The Town Council has applied for sanction to loans of £10,000 for mains, and £5,000 for hired apparatus.

**Middlesex.**—HOSPITAL EQUIPMENT.—The County Council Health Committee has voted £10,000 for furniture and equipment for the extensions at the West Middlesex Hospital. This sum includes provision for electric refrigerators, electric clocks, and apparatus for the electrical department.

**Northumberland.** — ELECTRIFICATION SCHEME. — A £60,000 scheme for the electrification of a large portion of rural Northumberland has been commenced by the Newcastle-upon-Tyne Electric Supply Co., Ltd. The scheme involves the erection of about 42 miles of 20,000-V overhead lines, the skeleton of the system comprising three trunk lines—from Hexham to Haltwhistle; Hexham to Bellingham, *via* Wark; and Shilbottle to Embleton, *via* Long Houghton and Howick.

**Port Talbot.**—LOAN.—The Corporation has applied for sanction to loans amounting to £50,823 for sub-stations and equipment, overhead and underground mains and services, street lighting fittings and assisted wiring.

**Preston.**—LOAN.—Sanction to a loan of £17,150 is to be sought by the Corporation Electricity Committee for expenditure on the Preston-Blackpool transmission lines and the Fleetwood and Lytham St. Anne's supplies.

**Salford.**—YEAR'S WORKING.—The Corporation electricity undertaking showed a net profit of £29,086 for the past year. Revenue increased by £11,859 to £341,832. A sum of £10,971 has been transferred to the reserve fund.

**Scarborough.**—YEAR'S WORKING.—A deficiency of £5,297 for the year ended March 31st is reported on the Corporation electricity undertaking, as compared with a deficiency of £2,785 for the previous year. The balance at the credit of the working capital account at April 1st last year was £9,586 and it is proposed to charge the deficiency for the year and the capital expenditure for which loan sanction has not been received (£446) to this account, leaving a balance in hand of £4,289.

**Seaham Harbour.**—YEAR'S WORKING.—A profit of £267, as against £810 in the previous year, is reported on the Urban District Council's electricity undertaking for the past year. The revenue amounted to £12,647. The smaller profit is accounted for by reduced charges which came into operation last September.

**Sheffield.**—MAINS EXTENSIONS.—The Corporation Electricity Committee is to extend mains at a cost of £16,000.

Sanction has been received to a loan of £75,000 for house wiring installations.

**Shrewsbury.**—TRANSFORMING PLANT.—The Town Council has applied for sanction to a loan of £3,600 for transforming plant, &c., in connection with the bulk supply.

**Stoke-on-Trent.**—SWITCHGEAR ALTERATIONS.—At a recent meeting of the Corporation Electricity Committee the engineer reported that he had arranged with the N.W. Midlands Joint Electricity Authority as to the carrying out, by the manufacturers, of the necessary alterations and additions to the switchgear on the three-phase e.h.p. system. The Committee decided to apply for sanction to the borrowing of £10,000 in connection with the works for which it will be responsible.

**Sunderland.** — YEAR'S WORKING. — A decrease of over 3,000,000 kWh representing a fall in revenue of £16,000 is shown in the report on the working of the electricity undertaking for the twelve months ended March 31st last. Industrial depression is given as the chief cause for the decline. One bright feature is the increased sale of electricity for lighting, heating, and domestic uses, and it is pointed out that had it not been for the development of the sales for non-industrial purposes, the effect of the depression would have been much greater.

**Symington (Lanarkshire).**—ELECTRICITY SCHEME.—Negotiations which have been proceeding for some time between the Clyde Valley Electrical Power Co. and the County Council of Lanarkshire for the introduction of electricity to Symington and district have resulted in the Council approving the company's scheme. Opposition to overhead lines for distribution has been withdrawn, and the Council is likely to facilitate the company's schemes in other rural parts of the county by not insisting on underground cabling. All wayleaves have been secured and the supply is likely to be available by the end of September.

**Syria.**—HYDRO-ELECTRIC DEVELOPMENT.—A good deal of attention is at present being paid in Syria to the question of utilising the available water power, in order to reduce the country's imports of coal. Several small hydro-electric stations are already in operation, and work has recently been commenced on the establishment of a 10,000-h.p. plant to the south of Tripolis. The Beyrouth Tramway Co. is also erecting a 2,500-h.p. hydro-electric station on the River Safa.

**Twickenham.** — NEW MAINS. — The London and Home Counties Joint Electricity Authority has notified the Town Council of its intention to lay main cables in Heath Road and Lion Road, from Denmark Road sub-station to Nelson Road, and from the Twickenham generating station to the Richmond main distributing station. The Authority also intends to lay duplicate mains in all streets where sub-mains are not already in existence; this scheme is in connection with the Twickenham street lighting scheme, and affects 49 of the principal thoroughfares of the town.

**United States.**—HYDRO-ELECTRIC SCHEME.—According to *Power*, the Federal Power Commission has approved the issue of a preliminary permit to the Southern Industries and Utilities, Inc., for a power project on the Lower Tennessee River. This scheme covers the stretch below Pickwick Landing, near the southern boundary of Tennessee and a point about 20 miles above the mouth of the river, and provides for the generation of 94,000 h.p. The estimated cost of the dam and navigation facilities is $46,000,000.

EXTENSIONS AT LOS ANGELES.—Preliminary plans are being made for the addition of 100,500 h.p. of steam and hydro-electric generating plant to the Los Angeles municipal power system.

**Westmorland and South Cumberland.**—SPECIAL ORDER.—The South Cumberland Electricity Supply Co., Ltd., has applied to the Electricity Commissioners to amend the draft Special Order so as to include certain additional streets in the rural districts of Bootle and Whitehaven.

**Wotton-under-Edge.** — PUBLIC LIGHTING. — The Parish Council has accepted the tender of the West Gloucestershire Power Co., Ltd., for the public lighting of the village.

# Traction

**Carlisle.**—INQUIRY.—The Northern Area Traffic Commissioners are holding an inquiry into the proposal by the Corporation to acquire and eventually scrap the tramway undertaking in the city.

**Diesel-electric Trains.**—TRIALS IN AUGUST.—It is understood that three all-British Diesel-electric railway trains now nearing completion at the Scotswood works of Sir W. G. Armstrong Whitworth & Co., Ltd., will undergo trials on three of the railway systems in Great Britain in August. It is estimated that if these engines are adopted a saving to the railway companies of more than £7,000,000 per annum will be effected.

**Gateshead.**—UNIFORMITY OF TRAMCARS.—An attempt is being made by the Town Council to secure uniformity in the type of tramcars used in the borough. If a satisfactory arrangement cannot be made with the tramway company the Corporation is to make an application to the Ministry of Transport on the matter.

**Glasgow.**—CHILDREN'S FARES.—The Corporation Transport Committee recommends that during July all children under 15 shall be allowed to travel on the tramways for a maximum fare of 1d.

**Japan.**—ELECTRIC RAILWAY EXTENSIONS.—It is proposed to extend the Ise Electric Railway to the city of Nagoya at a cost of 5,000,000 yen.

**Middlesbrough.**—PURCHASE OFFER REJECTED.—The Corporation Tramway Committee has rejected the offer of the United Automobile Services, Ltd., which is associated with the London and North Eastern Railway Co., Ltd., to purchase the town's tramway system.

**Southend-on-Sea.**—RAILLESS-CAR EXTENSIONS.—The Town Council is to extend the railless-car route from Priory Park, along Fairfax Drive to Eastwood Boulevard, at an estimated cost of £7,166.

**Southern Heights Light Railway Co.**—REVIVAL OF POWERS.—Application has been made to the Minister of Transport for an Order reviving and amending the powers granted to the company under the Order of 1928 and extending the time limited for the completion of the railway.

# Telegraph and Telephone

**Kenya.**—RADIO-TELEGRAPHY.—The direct wireless telegraph service between England and Kenya Colony which has been operated at this end by the General Post Office was taken over on July 1st by Imperial and International Communications, Ltd. At present the service handles deferred and daily letter telegrams only. The receiving station in Kenya is at Nairobi and is operated by the British East Africa Broadcasting Co.

**Telephone Recording.**—STEEL WIRE SYSTEM.—A device which enables everything said by both parties concerned in a telephone conversation to be recorded on a magnetic steel wire in such a manner that it can be reproduced at any subsequent time is announced by the International Telephone and Telegraph Corporation. The record so obtained can be preserved as long as may be requierd, but it is also possible to obliterate the message so that the wire can be used over and over again. By reason of the recent association with the International System of the Echophon Maschinen A.G., of Berlin, which has been furthering the development of this device, it is now possible to place this conversation recorded at the disposal of telephone users, and thus greatly increase the usefulness of the telephone in all countries in which the International System operates telephones or provides communication equipment. One of the important applications of the conversation recorder is in connection with long-distance cable and radio telephone calls.

**Telephony.**—WORLD'S DEVELOPMENT.—The fact that the telephones of the world increased by three-quarters of a million during 1930 is revealed in statistics just published by the American Telephone Company and compiled with the co-operation of various telephone authorities throughout the world. The total number in use on January 1st, 1931, was 35,300,000, of which North America had 21,695,375, or 62.84 per cent.; Europe had 10,035,580, or 29.07 per cent.; Asia came third with 1,201,008 (3.48 per cent.), Oceana fourth, and South America fifth. Africa with only 236,108, or 0.68 of the world's total, was the least developed from a telephone point of view. The United States had more than half the telephones in the world with a total of 20,201,023, an increase of 133,000 during the year; Germany claimed 9 per cent. of the world's total, Great Britain 5½ per cent., Canada 4 per cent., and France 3 per cent. The number of telephones owned by various Governments at the beginning of the year was 11,117,468; the rest were under private management. Only 1,239,834 telephones in Europe were privately owned at the date of the survey, Great Britain, Germany, France, Russia, Belgium, Austria, the Netherlands, and Switzerland having State control.

TELEPHONE DENSITY.—Four American cities stand at the head of the density list. San Francisco has 40 telephones for every 100 people, Washington 33, Denver and Seattle 32; Stockholm and Los Angeles are only a fraction behind the 32 mark: then follow Chicago, Omaha, Toronto, Minneapolis, New York, Pittsburgh, Montreal, Oslo, Copenhagen, and Zurich. Paris has 12.5 telephones per 100 people and London has only 8.7. Taking the world by countries, America is at the top again with 16.4 telephones for every 100 of her inhabitants.

DOMINIONS BEAT BRITAIN.—Two British Dominions surpass Great Britain; Canada, which is second in the world's list, with 14.2 telephones per 100 of the population and New Zealand, which is third, with 10.3. Denmark, with 9.6, is fourth and is at the head of the European countries. Great Britain is tenth with four per 100 people.

**The Telephone Service.**—FOLKESTONE.—The local service was converted to satellite automatic working on June 20th. New exchanges have been provided in Folkestone, Hythe, Cheriton, and Lyminge, and an existing building was converted at Sandgate. A new manual trunks board has been provided and 3,000 subscribers were transferred; ultimately 10,000 will be served. The satellite junction cabling involved the drawing in and jointing of some 4,000 miles of wire.

MANCHESTER.—The city, with the adjoining Borough of Salford, boasts a population of over 1,000,000 and the new automatic service, which was cut-over on June 13th, is equipped on the Strowger director principle, it thus being the first provincial area to be modelled on the London plan. The new Blackfriars exchange was equipped to the order of the Post Office by the Automatic Telephone Manufacturing Co., Ltd., and, curiously enough, the main Manchester exchange is actually inside the Salford boundary, being located in Chapel Street, and will ultimately house three separate exchanges, each of 10,000 lines capacity; the remaining two will be named Deansgate and Victoria. The auto-manual equipment facilitates interconnection between automatic and manual subscribers during the transition period and is accommodated on the 6th and 7th floors, the latter being the largest switchroom of its kind in the world. These boards have been in service for some months, and will be still further extended as a centralised inquiry and information exchange, as well as a routing centre for traffic in and through the Manchester area, which is the principal junction centre of the industrial north. Formerly, the Central exchange formed the connecting link between the various exchanges in and around the city and this work is being transferred to the new Toll switchboard, located alongside the auto-manual equipment. The diversion of subscribers' lines and junctions to the new building has been a task of considerable magnitude, involving the construction of duct routes through some of the busiest and most congested thoroughfares. One route consists of a nest of 120 separate ducts, each capable of accommodating a 1,200-pair cable; another comprises 126 ducts, whilst 250 ducts actually enter the new exchange building. The total length of single duct provided amounts to 246 miles and 36 miles of cable, comprising 26,000 miles of single conductor, have been laid. In many instances ducts and manholes had to be constructed at depths of over 30 feet below the roadways. The number of separate exchanges will be 37 when the scheme is complete and the system is a 7-digit one embodying a 3-letter exchange code for routing calls to the required destination, prior to selecting the actual number of the wanted subscriber. So large an exchange consumes considerable current, which is furnished by large Alton storage batteries, each comprising 25 cells and of 10,000 ampere-hour capacity, individual cells weighing approximately 2 tons each. The battery is capable of an output of 2,000 amperes and is in duplicate, the Crompton-Parkinson charging motor-generators being the largest installed in Great Britain for telephone service; each has an output of 3,200 amperes and runs off the Corporation supply mains. To render the service immune from breakdown even in the event of failure of the electricity supply, an emergency semi-Diesel oil-engine generating set is installed in the basement, and has an output of 1,600 amperes at 57 volts.

# Radio

**Broadcasting Conference.**—SWISS MEETING.—Important questions concerning the distribution of wavelengths, frequencies, and the power of broadcasting stations were discussed at the meeting of the International Radio Broadcasting Conference which met at Lausanne on June 25th and lasted until the end of the month. Other subjects included the exchange of broadcasting programmes and what the French call the "battle against parasites," by which they mean "atmospherics."—*Reuter* (Lausanne).

**North Regional Station.**—DUAL RECEPTION TESTS.—The B.B.C. arranged for full dual-programme reception tests to be radiated from the north regional station on the nights of July 1st and July 4th. From 6.40 p.m. until approximately 10.30 p.m. on those two evenings the north transmitter (479 metres) radiated a regional programme, while the other transmitter (301 metres) relayed the national programme.

**U.S.A.**—RECEIVER CENSUS.—The 1930 national census forms included returns of receiver ownership and preliminary figures released by the Bureau of the Census from 25 of the 48 states prove that there are not nearly as many sets in the country as had been imagined. According to *World-Radio* the Department of Commerce estimate made in the autumn of 1930 is more than 14 per cent. too high. The average percentage of families in 25 states and the district of Columbia reporting radio sets is 35.46 per cent., or approximately one set to every three families. A total of 2,374,287 sets has been counted so far.

# Contract Information

*When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below*

## Contracts Open

**Ayr.**—County Council. Electric lighting for housing scheme. Schedules from Mr. W. Reid, county architect, 14, Wellington Square, Ayr.

**Bridlington.**—August 10th. Corporation. (a) Substitution of a.c. for consumers' d.c. plant and wiring, and (b) single-phase installations. (See this issue.)

**Carlisle.**—July 17th. Electricity Department. 11,000-V overhead transmission line in connection with a supply to rural districts. (June 26th.)

**Dundee.**—July 8th. Education Committee. Electric lighting and heating installations at SS. Peter and Paul School. Specifications, &c., from Messrs. Allan & Friskin, architects, 26, Castle Street, Dundee (deposit £1 1s.).

**Dunfermline.**—July 13th. Town Council. Electric lighting of 210 houses. Schedules from Mr. D. H. Shaw, burgh engineer, City Chambers (deposit £1 1s.).

**Edlington** (NORTHUMBERLAND).—July 11th. West Riding Public Health and Housing Committee. Wiring for lighting alterations at Crookhill Hall Receiving Home, West Riding. Architect, County Hall, Wakefield.

**Egypt.**—CAIRO.—August 24th. Ministry of the Interior. Electric lighting installation for the town of Akhmim, near Sohag. (A.X. 10970.)*

August 20th. Two step-down power transformers of 50 kVA and accessories for the Assiout power station. (A.X. 10985.)*

September 2nd. 125-kVA motor generator, Diesel engine, switchboard, &c., for Delta barrage spinning factory. (A.X. 10984.)*

**Grays Thurrock.**—July 8th. Electricity Department. Static transformers, h.p. and l.p. switchgear and l.p. cables. (June 19th.)

**Kirkwall** (ORKNEY).—July 15th. Electric lighting installation for housing scheme. Specifications from burgh surveyor.

**London.**—CENTRAL ELECTRICITY BOARD.—July 20th. Central indication and telephone equipments for the Mid-East England Electricity Scheme. (June 19th.)

OFFICE OF WORKS.—July 23rd. (a) Mechanical, and (b) electrical engineering labour in Manchester district. (See this issue.)

**Manchester.**—July 13th. Electricity Department. Prepayment meters. (See this issue.)

**Newmilns and Greenholm (Ayrshire).**—July 18th. Town Council. Electric wiring for housing scheme. Specification from Mr. J. H. Gilmour, burgh surveyor.

**New Zealand.**—WELLINGTON.—August 27th. Government Railways. Underground telephone cable equipment between Wellington and Paekakariki. (A.X. 10932.)*

August 19th. Post and Telegraph Department. Private automatic branch exchange equipment. (A.X. 10967.)*

August 28th. 500 microtelephone handles. (A.X. 10980.)*

August 25th. Public Works Department. Storage battery for Mangahao power scheme. (A.X. 10964.)*

**Pontardawe** (SWANSEA).—July 11th. Rural District Council. Reconstruction of electricity undertaking. (June 26th.)

**Roxburgh.**—July 11th. District Mental Hospital Joint Committee. Electrical work for housing scheme. Schedules from J. and J. Hall, architects, Galashiels.

**South Africa.**—JOHANNESBURG.—City Council. July 23rd. Electrically-operated automatic signals (A.X. 10981)*; and street lighting time switches (A.X. 10982).*

July 23rd. 42 single-rate meters and 42 two-rate meters. (A.X. 10976.)*

KLERKSDORP.—August 7th. Municipal Council. Power station and distribution network. (A.X. 10983.)*

**Wadsley (nr. Sheffield).**—July 8th. West Riding Mental Hospitals Board. Electric lighting installation in females' wing at Wadsley Mental Hospital. Specification (deposit £1) and form of tender from Mr. W. E. H. Burton, architect to the Board, Wakefield.

**West Midlands.**—July 11th. Joint Electricity Authority. 11,000-V underground cables and l.p. overhead and underground distribution system. (June 19th.)

**Wombwell** (YORKS.).—July 16th. West Riding Education Committee. Electric lighting installation at new open-air school. Particulars from the education officer, County Hall, Wakefield.

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

## Contracts Closed

**Birmingham.**—Education Committee. Accepted:—
Repairs to electric lighting apparatus at various schools for the year ended June 30th, 1932.—Hope's Heating and Lighting, Ltd.; Davis & Millward; W. J. Sheath.
Electric lighting installations at schools: Burbury Street (£121), Barford Road (£691), Dartmouth Street (£293), and Birches Green (£142).—T. Glover; Nechells (£175).—J. H. Payne & Co.; Wooley Castle estate (£811).—Davis & Millward.

**Birkenhead.**—Electricity Committee. Accepted:—
Transformers.—General Electric Co., Ltd.; Metropolitan-Vickers Electrical Co., Ltd.
H.p. cable.—Macintosh Cable Co., Ltd.

**Bridlington.**—Town Council. Accepted:—
Replacement of motors and plant at consumers' premises (£1,743).—Dynamo & Motor Repairs, Ltd.
A.c. meters (£8,987).—Measurement, Ltd.

**Brighton.**—Pavilion Committee. Accepted:—
Electric blowing equipment for organ (£275).—Morgan and Smith.

**Coseley.**—Education Committee. Accepted:—
Installation of electric lighting in five schools (£935).—W. G. France.

**Dorchester.**—Electricity Committee. Recommended:—
Feeder cable (£618).—Hackbridge Cable Co., Ltd.

**Glasgow.**—Transport Committee. Recommended:—
Lead-covered cable.—Standard Telephones & Cables, Ltd.
Electricity Committee. Recommended:—
Prepayment meters.—Metropolitan-Vickers Electrical Co., Ltd.; Edison Swan Electric Co., Ltd.; Chamberlain and Hookham, Ltd.; Ferranti, Ltd.
D.c. meters.—Chamberlain & Hookham, Ltd.; Ferranti, Ltd.
Lift at Waterloo Street premises (£1,500).—Express Lift Co., Ltd.
Single cables.—Metropolitan Electric Cable & Construction Co., Ltd.
L.p. cables.—Callender's Cable & Construction Co., Ltd.; Metropolitan Electric Cable & Construction Co., Ltd.
E.h.p. cables.—Callender's Cable & Construction Co., Ltd; W. T. Glover & Co., Ltd.
Telephone cable.—Callender's Cable & Construction Co., Ltd.
Rubber insulated cables and flexibles.—Craigpark Electric Cable Co., Ltd.
A.c. meters.—Edison Swan Electric Co., Ltd.; Ferranti, Ltd.; Metropolitan-Vickers Electrical Co., Ltd.
Cast-iron boxes, section pillars, &c.—Carron Company; Falkirk Iron Co., Ltd.; David King & Son, Ltd.; Lane and Girvan, Ltd.; Lion Foundry Co., Ltd.; M'Cullum and Hope, Ltd.; M'Dowall, Steven & Co., Ltd.; Walter M'Farlane & Co.; Mitchell, Russell & Co.
Police Committee. Recommended:—
Street lanterns.—Credenda Conduits Co., Ltd.

**Hull.**—Education Committee. Accepted:—
Electric lighting and power installation at Malet Lambeth School (£1,593).—Miller & Garness.

**Lamp Contracts.**—A contract has been placed by H.M. Office of Works with the British Thomson-Houston Co., Ltd., for gasfilled and vacuum lamps for the period ending May 31st, 1932. The company has also received an order from the Royal Mail Steam Packet Co., Ltd., for a part supply of Mazda lamps for the period ending May 31st, 1932.

The British Electric Transformer Co., Ltd., has received a contract from H.M. Office of Works for 12 months' supply of Kye electric lamps.

Siemens Electric Lamps & Supplies, Ltd., have received a contract from the Royal Mail Steam Packet Co. for 12 months' supply of electric lamps.

**Leeds.**—Electricity Committee. Accepted:—
Cables.—W. T. Henley's Telegraph Works Co., Ltd. (£214); Macintosh Cable Co., Ltd. (£1,172); Derby Cables, Ltd. (£954); Metropolitan Electric Cable & Construction Co., Ltd. (£1,914).
Sub-station fuse panels (£166).—Yorkshire Switchgear and Engineering Co., Ltd.
Three 10,000-kVA transformers (£9,845).—Hackbridge Electric Construction Co., Ltd.

**Salford.**—Electricity Committee. Recommended:—
Switchgear (£580).—Switchgear & Cowans, Ltd.
Five 200-kVA transformers (£425).—General Electric Co., Ltd.
Transport Committee. Recommended:—
Cadmium-copper trolley wire (£263).—Frederick Smith and Co., Ltd.

**Sheffield.**—Electricity Supply Committee. Accepted:—
Sub-station switchgear (£2,578).—A. Reyrolle & Co., Ltd.
Eight 150-kVA sub-station transformers (£824).—English Electric Co., Ltd.
Nine 300-kVA transformers (£1,395).—British Electric Transformer Co., Ltd.
Two 450-kVA transformers (£412).—Ferranti, Ltd.

**Shrewsbury.**—Town Council. Accepted:—
Transforming plant (£2,832).—English Electric Co., Ltd.

## Forthcoming Events

**Institution of Mining Engineers.**—July 8th-10th. Manchester. Annual general meeting.

**Society of Chemical Industry.**—July 13th-18th. London. Jubilee celebrations.

**Institution of Electrical Engineers (London Students' Section).**—July 18th-28th. Italy and Switzerland. Summer meeting.

**International Congress of Radiology.**—July 26th-31st. Sorbonne, Paris.

## Our Service Department

Inquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the names and addresses of the makers of the following:—

BIRMACO bowl fires, kettles, &c.
VITALUX bowl fire.
The PENTECON cooker.

# Notes

## The Faraday Centenary and the Schools

In view of the importance of educating the younger generation in the uses of electricity, we are very glad to give publicity to the following suggestions of the chairman of the Poplar Electricity Committee:—

"While there is no doubt that every possible method will be used to attract men and women to the Faraday Centenary Exhibition in September, I am wondering what effort will be made to utilise the wonderful educative and advertising value of the Exhibition for electricity's finest potential asset, the citizens of the near future.

"In our much criticised borough we have proved the value of what one might call long distance advertising. Every scholar in Poplar during his, or her, last term at school is taken to one of our public libraries and taught by members of the staff how to make the best use of the facilities provided. The result has been that we find it almost impossible to cope with the public demand for the services given.

"The opportunity which will arise in September to utilise the Exhibition on similar lines is, I think, too valuable to be neglected. I suggest that one way this could be done would be for the L.C.C. Education Department to organise visits as part of its "School Journeys" scheme, which at present obtains. Another way (and here one writes with an appealing eye on the District Auditor) would be for local authorities owning undertakings to organise such visits themselves, paying the cost out of their revenue. We are at present allowed to spend any reasonable sum for advertising our supply and money spent in the direction indicated could certainly be claimed to be legitimate advertising to potential consumers. Further, I would suggest that if anything is done on these lines, the Exhibition Committee or the E.D.A. might arrange to have a part of the Exhibition specially planned and directed to appeal to older children.—A. EASTEAL."

## Deptford (West) Power Station

We learn that practically all the motors driving the auxiliaries at the Deptford (West) power station of the London Power Co., which was described in our issue of June 12th, p. 979, are of the "Maxtorq" squirrel-cage type, and in the aggregate amount to 6,700 h.p. What is of particular interest, however, is that, except the two-speed draught fan motors, all the machines are switched direct across the line, thus rendering the problem of distribution much easier, and enabling the motor control gear to be laid out to better advantage.

## The Electric Trawl Winch

One of the most interesting developments of recent months in the sphere of electrical ships' deck auxiliaries has been the successful introduction of electric trawl winches on large Diesel engine trawlers by Messrs. Clarke, Chapman & Co., Ltd. Of all ships' deck auxiliaries the winch used for manipulating the trawl of the modern deep-sea fishing vessel has to deal with the most variable and sometimes sudden loads, in order to meet which arduous and unforeseen duties such winches have hitherto always been designed on generous lines and the use of steam as a driving agent has been considered essential. However, the advent of such large foreign motor trawlers as the *St. Martin Legasse* and her three sister ships, the *Corte Real*, and the *Descobridor* made the introduction

of a suitable electrical gear essential. The machine illustrated herewith combines the advantages of silence and low power losses with the soundness of design associated with steam-driven gear. The trawl winches of the *Corte Real* and *Descobridor* are designed to exert a pull of 4½ tons from the top layer of the rope from one barrel at a time at a maximum speed of 175 feet per minute. They are driven by enclosed, ventilated, drip-proof motors developing 95 b.h.p. at 550 r.p.m. In each case the motor is arranged to be placed in the deck house, driving the winch through worm and spur gearing. A magnetic brake is incorporated. The barrels are 1 ft. 7 in. in diameter and the flanges 3 ft. 11 in. in diameter, while the barrel length is 3 ft. ½ in. The barrels are capable of carrying 800 fathoms of 67-mm steel-wire rope. In addition to the barrels, warp-ends of a diameter of 19 in. are fitted on both ends of the barrel shaft. Messrs. Clarke, Chapman & Co., Ltd., also supplied two electrically-driven warping capstans and two electrically-driven windlasses for the two vessels named.

## Rapid Kinematography

A paper on a new system of rapid kinematography, enabling exposures of a frequency up to 100,000 a second to be made, was recently read before the Academy of Sciences at Paris. According to *The Times*, the inventors, MM. Labarthe and Séguin, rely upon special lighting and a rapidly revolving disk of sensitized film. The light is provided by a succession of sparks given off by a condenser set in a neon tube. By this means the inventors have succeeded in obtaining clear photographs of the process of fuel injection in internal combustion engines.

## Electricity Charges

In the ELECTRICAL REVIEW of June 12th (p. 1007) we reported the issue of a memorandum by Mr. W. F. Marchant, O.B.E., L.C.C., chairman of the London and Home Counties J.E.A. to the Conference of Electricity Supply Authorities, on the subject of electricity charges and methods of charging. This memorandum formed the basis of resolutions submitted at two conferences held on June 9th and 11th to which, respectively, representatives of 50 authorities north of the Thames and 33 authorities south of the Thames were invited. The resolutions were as follows:—

"(*a*) That a committee of this Conference be appointed, consisting of two representatives of company supply authorities, two representatives of municipal supply authorities, and one of the Joint Authority, to consider and report upon the points raised in the memorandum of May, 1931, issued by the chairman of the Joint Authority."

"(*b*) That it be specially referred to the committee to consider and report upon the practicability of supply authorities adopting the same forms and bases of multi-part tariffs and the same method of arriving at the 'primary' or fixed charge and the 'secondary' or 'unit' charge, and, if found to be impracticable, to make alternative suggestions."

"(*c*) That the supply authorities be requested to furnish such assistance in the nature of official advice and information as the Committee may require."

The resolutions were not carried, and the Special Committee upon Charges for Supplies of Electricity in a report adopted by the Authority on June 24th recommends "that a copy of the chairman's memorandum be forward to the Minister of Transport and the Electricity Commissioners with a note of the proceedings of the two conferences referred to, and that it be suggested to the Minister and the Commissioners that they should consider the whole position from the points of view expressed in that memorandum, including, if necessary, the introduction of fresh legislation to bring the statutory provisions relating to tariffs more into conformity with modern requirements and practice."

## History of Science Congress

For the second International Congress of the History of Science and Technology, men of science from all parts of the world who are interested in the evolution of their subjects are meeting this week in London (June 29th to July 4th) under the presidency of Dr. Charles Singer. The Congress is being held under the auspices of the Comité International d'Histoire des Sciences, with the collaboration of the Comité International des Sciences Historiques, the Newcomen Society for the Study of the History of Engineering and Technology, and the History of Science Society. The Science Museum, South Kensington, is the headquarters throughout the week and Government Departments have offered hospitality. Subjects for discussion will be "The Sciences as an Integral Part of General Historical Study," "Teaching of the History of Science," the "Historical and Contemporary Inter-relationship of the Physical and Biological Sciences," and the "Interdependence of Pure and Applied Science." America is well represented by delegates from 27 institutions, and representatives have been appointed by universities and institutions in France (and Morocco), Germany, Russia, Switzerland, Poland, Holland, Belgium, Italy, Greece, Norway, Czechoslovakia, two South American Republics, Japan, and Egypt. A full programme of social entertainment included receptions by the Royal Society, the Royal Society of Medicine, the Royal Institution, and the Institute of Historical Research. Excursions are being made to the Universities of Oxford and Cambridge, and University College, London, entertained members at an Independence Day luncheon on July 4th.

## High-voltage Transmission in Russia

At the Russian Academy of Science recently in session in Moscow it was suggested by the Moscow *Economic Life* that members should now devote themselves to the solution of the problem of high-voltage transmission as applied to Russian conditions, at pressures of between 400,000 and 600,000 volts. On the solution of this problem depended the possibility of projecting in the second quinquennial period, which will end in 1937, the creation of high-voltage networks to embrace all the regional stations, which network had been decided upon in the general plan of electrification. In this respect it was stated to be impossible to rely upon foreign experience as a whole, as the antipathies between individual foreign countries would never allow of the possibility of connecting regional stations in Germany, France, Switzerland, &c., by means of a high-voltage network, and there was therefore no practical demand for the solution by a given date of the technical problems associated with the question.

## High-voltage Transmission in Germany

Speaking at a conference of German electrical engineers at Frankfort-on-Main, Herr Oskar von Miller traced the development of electrical transmission from the time when M. Marcel Deprez sent continuous current at 1,500-2,000 volts between Miesbach and Munich, a distance of 57 kilometres. Since then progress has been rapid; the first 100,000-volt transmission line in Europe was that between Lauchhammer and Riesa; the first installation at 220,000 volts was carried out by the Rhenish-Westphalian electricity works between Ronsdorf and Lethmate in 1922, and the same company has now brought into use the first overhead line in the world operating at 380,000 volts for the transmission of power from the Voralberg water-power station to the industrial district of Rhineland.

## Appointments Vacant

Assistant consumers' engineer for Workington Electricity Department.

Electrical engineer and manager of the Transport Department of Haslingden Corporation.

Senior consumers' accounts clerk for Stoke-on-Trent Electricity Department.

Lady demonstrator for Cheltenham Electricity Department.

Assistant engineer and two junior mains assistants for Brighton Electricity Department.

(See our advertisement pages to-day.)

## Metal Scrap Fusion

Mr. W. G. C. Nixon, a past-president, records the following item of practical experience in the *Journal* of the South African Institution of Engineers. At one of the mines the usual workshop scrap heap of metal turnings, &c., was piled to a height of 5 ft. and covered a considerable area. One morning two of four 3-core 2,000-volt cables which were laid together in one trench 18 in. below the surface of the ground under the scrap dump failed. About 15 ft. of their outer serving had been burnt clean off, while the insulation between the cores, although broken down, was only charred; the cables were not punctured. When the investigation was begun and the dump had to be removed, it was discovered that it was so hot that work had to be suspended for a time. The turnings and other metal scrap were actually fused together into a mass. The heat could not have come from the inside, because all four cables would have been affected and the inside insulation of the cables would have been destroyed, so that the heat must have started in the dump. There was a certain amount of ash thrown out from the fire buckets in the shop, some of which might have been burning, but the fused portion was not on the surface of the dump, and must have been there for months. Among the explanations that had been advanced one was that some chemical action might have been set up, and possibly there was sulphur in the coal which caused heavy oxidation, due to rain, and developed sufficient heat to fuse the metal. Another explanation was that it might have been some kind of inductive action in connection with the cables.

## Preservation of Niagara Falls

We have just received from the Dominion Department of the Interior at Ottawa a copy of the final report of the Special International Niagara Board appointed by the Governments of Canada and the United States in 1926 to investigate and report upon the Niagara Falls and the factors bearing upon their scenic beauty. The Board issued an interim report, dated December 14th, 1927, putting forward certain recommendations embodied in the Niagara Convention, signed on June 2nd, 1929, between the two Governments concerned, and the report now published gives in great detail the data on which the recommendations in question were based. It analyses exhaustively the factors bearing upon the preservation of the scenic beauty of the falls and rapids, and discusses the type and character of the remedial works best suited to achieve this end. The problem of present and future withdrawals of water for hydro-electric power development and other purposes is also dealt with at great length, and definite conclusions reached as to the programme which should be followed by the two Governments in this connection. Among the remedial works recommended by the Board are submerged deflecting weirs placed in the rapids above the falls, and lying diagonally and irregularly across the current, being so constructed as to be indistinguishable from the natural irregularities already present in the rapids. A further submerged weir is suggested towards the lower end of the Grass Island Pool, which will ensure an adequate flow in the American rapids and falls, and between the Three Sister Islands. The Board has arrived at the conclusion that additional water for power or other purposes should be withdrawn only in conjunction with the construction of remedial works. The only manner in which the complete effectiveness of these remedial measures can be satisfactorily established as both enhancing the scenic values and permitting the additional withdrawal of water for power is by actual demonstration at the falls. It is, therefore, proposed that, coincidently with the construction of the works, there should be permitted the temporary withdrawal of additional water up to 10,000 second feet on each side of the river. Such withdrawals should not be made during the tourist season, and the water should not be led through the existing passages of the power stations already in existence at the falls. Thus, the two Governments would be able to ascertain whether the remedial works and experimental withdrawals are successful in their object and whether a treaty providing for permanent withdrawals should be negotiated. If the temporary measures outlined above demonstrate the probability of successful permanent arrangements of a similar character, it is suggested that the two Governments should be invited to authorise permanently the additional diversion of a total up to 20,000 cu. ft. of water per second, or of such amount as might be agreed upon, and that after observation of the conditions existing following this permanent diversion, the two Governments might then proceed along similar lines to ascertain whether and to what extent additional diversions might be practicable.

## Electrical Exploration

The results of electrical exploration carried out for the Department of Railways and Canals in connection with a topographical study of a dam site at Morrisburg, Ont., in Canada, are described in the *Journal* of the Engineering Institute of Canada. The method used was that of Prof. C. Schlumberger, which depends on the measurement of an electric field created in the ground by current passed between two electrodes at the ends of a known base line. Several series of measurements are made with different lengths and directions of base line, thus determining many equipotential curves from which the average resistivity of the sub-soil can be deduced. Most rocks have resistivities of from 1,000 to 2,000 ohms per metre-metre square, while clayey formations have corresponding values of from 10 to 400 ohms. Depths calculated by the electrical method agree closely with those actually measured by drilling and the conclusions to be drawn from the practical work described in the paper are that the equipment can be built so that it can be handled conveniently by a single individual, even under the most trying conditions when the place to be investigated is difficult of access. Under such circumstances an electrical survey will often result in an appreciable saving of time and money. The geological study of bedrock conditions can be efficaciously supplemented, and, when the bedrock and the overburden possess different electrical conductivities, such a survey makes it possible to determine the depth to bedrock at a given place from electrical measurements carried out at the surface. Since the procedure is rapid and cheap, very large areas can be systematically covered, thus enabling the preparation of a veritable topographical map of the bedrock. The possibilities of the process are not by any means limited to the study of dam sites, since the measuring of the thickness of an overburden is a problem which is frequently encountered in civil engineering as well as geological work.

## Insulating Boards

The manufacture of insulating boards with a paper base, whilst simple in principle, calls for considerable experience and for exact technical control, if satisfactory electrical properties are to be obtained. The principle of manufacture is to impregnate a suitable paper with a synthetic-resin varnish, drive off the solvent by stoving, and, by super-imposing sheets of the paper so treated, compress them into a compact sheet of insulating material in a powerful hydraulic press fitted with heated platens. During the pressing process the resin first melts, and under the pressure completely impregnates every fibre of the paper. As the heating process is continued, the resin gradually hardens to an infusible and insoluble mass. Skilled supervision is necessary at each stage. It is necessary to ensure that all paper used for the same type of board has approximately the same degree of absorbency; and the length of stoving after impregnation with varnish is most important. These materials are made by a number of manufacturers, and the accompanying data are due to the Ioco Rubber and Waterproofing Co. The "P.F." grade is a board which has the least water absorption; it is specified for naval work, and is also used for high-frequency work, being able to withstand a five-minute test at 100,000 cycles without undue heating. The "P.O." grade is a general service board of high grade and is also superior in machining to the "P.F." grade. The "P.M." and "P.R." grades are lower-priced boards with good electrical characteristics. "Micarta" boards are largely used for e.h.p. transformers and switchgear, as they do not soften under oil or heat.—H. E. HUTTER.

TEST RESULTS

| Nature of Test. | Grade PF | Grade PO | Grade PR | Grade PM |
|---|---|---|---|---|
| Electric strength (minute value)— | | | | |
| Volts/mil* at 90 deg. C., 1/16 in. board ... ... | 350 | 500 | 450 | 400 |
| Volts/mil* at 90 deg. C., 1/4 in. board ... ... | 170 | 200 | 180 | 140 |
| Surface breakdown, kilovolts in air, at 20 deg. C. ... | 25/1½ in. | 25/1½ in. | 25/1½ in. | 25/1½ in. |
| Breakdown along laminæ, kilovolts/inch, at 90 deg. in oil ... ... ... ... | 40/1 in. | 40/1 in. | 40/1 in. | 25/1 in. |
| Tensile strength, lb./sq. in. | 15,000 | 20,000 | 22,000 | 14,000 |
| Compression strength— | | | | |
| lb./sq. in. at right angles to the laminæ ... ... | 44,000 | 46,000 | 47,000 | 40,000 |
| lb./sq. in. in the direction of the laminæ ... ... | 22,000 | 22,000 | 25,000 | 24,000 |
| Shearing strength, lb./sq. in. | 10,000 | 12,000 | 16,000 | 10,000 |
| Water absorption after 24 hours' immersion on a specimen 1½ in. by 1½ in. by ½ in. thick ... ... ... | 0.1 | 0.5 | 0.75 | — |
| Water absorption after 6 days' immersion on a specimen 1½ in. by 1½ in. by ½ in. thick | 0.25 | 0.8 | 1.0 | — |

* Mil=0.001 inch.

# Our Personal Column

**Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements**

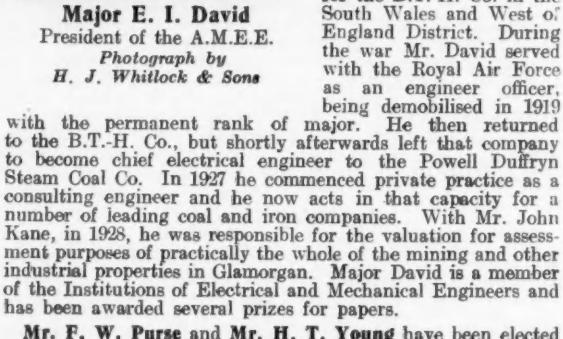
**Major E. Ivor David**, the new president of the Association of Mining Electrical Engineers is well qualified for that position. After receiving his education at Pengam Grammar School and Liverpool College he served a mechanical engineering apprenticeship, and then, from 1898 to 1901, was engaged as an engineer at steelworks in Cumberland and South Wales. In 1901 he became assistant to Mr. S. W. Allen, the Cardiff colliery consultant and two years later entered Cardiff University College, where he took the full course in mechanical, electrical, and civil engineering. Subsequently, he joined the Brush Electrical Engineering Co., Ltd., as experimental and testing engineer, incidentally being superintendent of the premium pupils at the Loughborough Works. In 1920 he became commercial engineer in the power and mining department of the British Thomson-Houston Co., Ltd., in which capacity he tendered for, and carried out, contracts for mining electrical equipment, &c. In 1914 he was appointed chief engineer and manager for the B.T.-H. Co. in the South Wales and West of England District. During the war Mr. David served with the Royal Air Force as an engineer officer, being demobilised in 1919 with the permanent rank of major. He then returned to the B.T.-H. Co., but shortly afterwards left that company to become chief electrical engineer to the Powell Duffryn Steam Coal Co. In 1927 he commenced private practice as a consulting engineer and he now acts in that capacity for a number of leading coal and iron companies. With Mr. John Kane, in 1928, he was responsible for the valuation for assessment purposes of practically the whole of the mining and other industrial properties in Glamorgan. Major David is a member of the Institutions of Electrical and Mechanical Engineers and has been awarded several prizes for papers.

**Major E. I. David**
President of the A.M.E.E.
*Photograph by H. J. Whitlock & Sons*

**Mr. F. W. Purse** and **Mr. H. T. Young** have been elected members of the executive committee of the Advisory Council of the Building Industry, which was formed last year to collect and co-ordinate information and views with the object of assisting Government departments, local authorities and others in the preparation of regulations, by-laws, &c.

**Mr. Maxwell D. Kippen**, of the G.E.C. Telephone Works, Coventry, and **Mr. J. M. Dodds**, Manchester, have been awarded Sir James Caird Travelling Scholarships valued at £400 each.

We reproduce with this note a photograph taken at the Strowger Works of the Automatic Telephone Manufacturing Co., Ltd., Liverpool, upon the occasion of the recent visit of **Prince George** to the works. In the back row—reading from left to right—are Mr. J. Nixon (works manager), Mr. T. H. Watson, the Chief Constable of Liverpool, Mr. G. W. Moore (director and manager), Mr. T. A. Eades (assistant manager), and Mr. A. F. Bennett (chief engineer). Those with Prince George in the front row are Sir Max Muspratt, Bt. (director), Sir Alexander Roger (chairman), and Lord Derby.



**Prince George at the Strowger Works**

**Mr. J. E. Shearman** has been presented with an inscribed gold watch by the staff of the Heston and Isleworth Electricity Department, upon his leaving the Department to take up the position of consumers' engineer with the Southend municipal undertaking. The Council officials gave him a silver tea and coffee service. Mrs. Shearman also received gifts.

**Mr. A. G. Parsons**, Dudley, and Miss E. M. W. Farmer, Kidderminster, were married on June 24th. They were both associated with the Shropshire, Worcestershire and Staffordshire Electric Power Company at Kidderminster, where the bride was a demonstrator, and the bridegroom assistant district engineer. Mr. Parsons is now district engineer at St. Mellons, Cardiff.

**Mr. T. B. Drummond**, chief draughtsman of the Liverpool Corporation Electricity Department, retired on superannuation last week and received a console radio set from his colleagues as a parting gift. The presentation was made by the chairman of the Tramway and Electric Power and Lighting Committee (Alderman F. C. Wilson) and all the chief officials of the department, including Mr. P. J. Robinson, attended the presentation ceremony. Mr. Drummond had been in the service of the Department for 35 years and before that was with the company which the Liverpool Corporation took over for eight years.

**Mr. A. F. Harmer**, of Wimbledon, has been appointed temporary assistant electrical engineer by Hammersmith Electricity Committee at a salary of £600 per annum.

**Mr. George Fothergill**, of the Barnsley Corporation Electricity Department, who was married on June 18th, was presented by his colleagues with an oak timepiece and a pair of bronzes.

**Mr. P. Gordon Hieatt** was recently appointed control engineer in the Mid-East England Area of the Central Electricity Board.

**Mr. H. W. Mattin**, who was formerly with the Dundee Corporation Electricity Department, has been appointed assistant engineer in the St. Marylebone undertaking.

The West Midlands Joint Electricity Authority recently appointed **Mr. P. M. Pinder** resident engineer at the Ironbridge station, and **Mr. O. J. Duffy** as station superintendent at Wolverhampton.

**Mr. F. S. Adkins**, formerly manager of the electrical department of Messrs. R. W. Crabtree & Sons, Ltd., Leeds, has been appointed works manager of the Kleanair Patent Fan Co., Ltd., Ware, Herts.

## Obituary

**Mrs. Iliffe.**—We regret to have to announce the death on June 27th of Mrs. Iliffe, the widow of Mr. W. I. Iliffe, the founder of the firm of Iliffe & Sons, Ltd., which took place at Allesley House, Coventry, in her 83rd year. Mrs. Iliffe, who was the daughter of Mr. and Mrs. James Coker, of Le Bouet, Guernsey, spent the greater part of her life in Coventry, and in the days when the business was beginning to develop took a keen personal interest in its working. In later years much of her time has been given to charitable and philanthropic work in Warwickshire, and very many there will miss a lady of great kindness and charm. She leaves two sons—Mr. W. Coker Iliffe and Sir Edward Iliffe, respectively director and chairman of E.R. (1930), Ltd., proprietors of the ELECTRICAL REVIEW, and a daughter, Mrs. Hopkinson.

**Mr. C. Gaskell.**—The death occurred at Ipswich on June 22nd of Mr. Charles Gaskell, one of the founders of the Ranelagh Works of Messrs. W. Reavell & Co., Ltd., of which company he was a director. The funeral took place on June 26th when a number of prominent local people were present, including Mr. and Mr. W. Reavell and Mr. Frank Ayton, of Ransomes, Sims & Jefferies, Ltd.

**Mr. J. A. B. Paddy.**—An old employé of the Stoke-on-Trent Electricity Department passed away last week. He was Mr. J. A. B. Paddy who entered the service of the old Hanley Corporation in 1898, and was "taken" over by Stoke-on-Trent when the amalgamation of the towns took place.

**Mr. W. L. Watkin.**—The death occurred recently of Mr W. L. Watkin, an assistant district engineer with the Newcastle-upon-Tyne Electric Supply Co., Ltd.

**Mr. N. Robinson.**—The death occurred recently, at Bradford, of Mr. Nixon Robinson, partner in the firm of Beedham and Robinson, electrical engineers, Bradford.

**M. Charles Mildé.**—The death is reported from Paris, at the age of 79, of M. Charles Mildé, a former president of the French Syndicat Professionel des Industries Electriques and a pioneer of the electric motor vehicle in France.

**Mr. F. Crawford.**—We regret to learn that Mr. Fred Crawford, the Liverpool manager of the General Electric Co., Ltd., died on June 27th at his residence at New Brighton. He was 56 years of age.

**Mr. W. Hayes.**—Mr. William Hayes, formerly chief electrician at Risca Collieries, passed away on June 20th, at the age of 75 years, at his residence at Risca.

# Financial Section

**New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares**

## New Companies Registered

**Patent Switch & Fuse Indicator Co., Ltd.**—Private company. Registered June 20th. Capital, £2,000 in £1 shares. Objects: To acquire all rights and interest of J. Lawn in an invention relating to improvements in connection with electric lighting (Patent No. 339,748), and also to acquire the business of manufacturers of switch and fuse indicators, now carried on by J. Lawn, F. Leslie Smith and W. Piercey at 1, Ryan Street, Bradford, as the "Patent Switch & Fuse Indicator Co." The directors are: J. Lawn, 97, Marsh Street, Bradford; F. L. Smith, 82, Lower Rushton Road, Bradford; W. Piercey, 223, Parkside Road, Bradford; J. Kennedy, Oak Mount, Selsden, Keighley.

**European Gas & Electric Co.**—Particulars filed on June 18th, pursuant to Section 344 of the Companies Act, 1929. Capital stock: $1,250,000 without par value, of which $200,000 is cumulative first preferred stock, $50,000 cumulative second preferred stock, and $1,000,000 common stock. The company was incorporated in the State of Delaware on February 24th, 1931. The British address is Bush House, W.C.2. G. F. Kennedy, of New Court, Middle Temple, E.C.4, is authorised to accept service of process and notices on behalf of the company.

**Etherlink Radio, Ltd.**—Private company. Registered June 22nd. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers and retailers of goods in connection with radio-telegraphy and telephony, &c. The subscribers (each with one share) are: E. Calder, 29, Gertrude Street, S.W.10; Mary Parker, 52, Revelstoke Road, S.W.18. Registered office: 75a, Bollobridge Road, Acton, W.

**Fulham Radio, Ltd.**—Private company. Registered June 24th. Capital, £1,000 in £1 shares. Objects: To carry on the business of electrical, wireless, mechanical and general engineers, engineering contractors, &c. The directors are: W. S. Stovold, 88, Putney Park Road, Roehampton, S.W.15, and R. Cohen, 28, Manse Road, Stoke Newington, N.16.

**Ayrshire Wireless Service, Ltd.**—Private company. Registered in Edinburgh on June 22nd. Capital, £1,500 in £1 shares. Objects: To carry on the business of wireless, electrical and mechanical engineers, &c. The subscribers are: W. R. Wyllie, 17, Bank Street, Kilmarnock, and W. D. Fisher, 68, Gordon Street, Glasgow. W. R. Wyllie is the first director. Secretary: W. D. Fisher. Registered office: 17, Bank Street, Kilmarnock.

**Battery Services, Ltd.**—Private company. Registered June 25th. Capital, £500 in £1 shares. Objects: To carry on the business of electrical, radio, mechanical and general engineers, &c. The subscribers are: W. T. Mower, 43, Hangingwater Road, Ranmoor, Sheffield, and D. K. Hodgson, Roundhills, Eckington, near Sheffield. The first directors are to be appointed by the subscribers. Solicitors: Arthur Neal & Co., Sheffield.

**Barker, Young & Co., Ltd.**—Private company. Registered June 25th. Capital, £1,500 in £1 shares. Objects: To adopt agreements with Young, Osmond & Young, Ltd., and the Electro-Gas Development Co., Ltd., and to carry on the business of electricians, mechanical and electrical engineers, &c. The directors are: E. A. Young, 100, Park Way, Welwyn Garden City, Herts. (director Young, Osmond & Young, Ltd.), and H. P. Barker, Oakhill House, Beckenham, Kent (director Electro-Gas Development Co., Ltd.). Registered office: 47, Victoria Street, S.W.1.

**Tonny Manufacturing Co., Ltd.**—Private company. Registered June 25th. Capital, £1,000 in £1 shares. Objects: To carry on the business of manufacturers, importers and exporters of and dealers in loud speakers and all other kinds of radio and electrical apparatus, &c. The subscribers are: J. S. Eyland, 111, Strathyre Avenue, Norbury, S.W.16, and A. H. J. Hayes, 27, Hoopwick Street, Deptford, S.F.8. The first directors are to be appointed by the subscribers. Registered office: 1a, Willesden Lane, N.W.6.

**E. C. Stokes, Ltd.**—Private company. Registered June 24th. Capital, £1,000 in £1 shares. Objects: To acquire the business of the Uneedus Electrical Co. carried on by E. C. Stokes at 9, Cheam Road, Sutton, Surrey, and to carry on the business of electrical, wireless, mechanical and general engineers, &c. The subscribers are: E. C. Stokes, Shelford, Ringstead Road, Sutton, Surrey (electrical engineer) and L. V. C. Parsons, 110, Whitehouse Road, West Croydon, Surrey. E. C. Stokes is permanent managing director.

**Appletons (Leeds), Ltd.**—Private company. Registered June 27th. Capital, £25,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in gramophones, kinematograph, wireless and television apparatus, musical instruments, &c. The first directors are: R. J. Appleton, Rimbalds, Ben Rhydding; R. N. Appleton, Daylesford, Denton Road, Ilkley; T. C. Appleton and E. Appleton (addresses not stated). The first two named are managing directors. Solicitors: Craven & Clegg, 6, East Parade, Leeds.

**Reliaphone Manufacturing Co., Ltd.**—Private company. Registered June 27th. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers, importers and exporters of, agents for and dealers in receiving and transmitting sets for telephony, telegraphy and television, &c. The directors are: L. S. Alexander and Mrs. L. Alexander, both of Ceriset, Marsh Lane, Hendon, N.W. Registered office: 1, Parternoster Row, E.C.4.

**Coventry Radio Relays, Ltd.**—Private company. Registered June 27th. Capital, £2,500 in £1 shares. Objects: To carry on the business of distributors and relayers of radio, television and other programmes, radio engineers and manufacturers, &c. The subscribers are: P. H. P. Wells, Copsewood Grange, Coventry, and W. Orme, 238, Binley Road, Coventry. The first directors are not named. Secretary: W. Orme. Registered office: 99, Wyley Road, Coventry.

## Returns of Electrical Companies

**Venreco, Ltd.**—Mortgage under Land Registration Act dated June 4th, 1931, to secure £9,500, charged on 76, Neal Street, W.C.2. Holder: A. L. Rea, 10, Stratton Street, Piccadilly, W.1.

**Wilkinsons (London), Ltd.**—Debenture, dated June 1st, 1931, to secure £1,000, charged on the company's property, present and future, including uncalled capital. Holder: Mrs. D. M. Howe, "Mornonih," Priests Lane, Brentwood, Essex.

**Electrical and Radio Products, Ltd.**—D. L. Honeyman, of 9, Basinghall Street, E.C.2, was appointed receiver by Order of Court dated June 2nd, 1931.

**Underwood (Manchester), Ltd.**—Satisfaction to the extent of £5,000 on June 9th, 1931, of "B" debentures authorised by resolution dated May 27th, 1927, and registered June 1st, 1927, securing £5,000.

**Gorseinon Electric Light Co., Ltd.**—Capital, £60,000 in £1 shares. Return dated March 31st, 1931. 57,000 shares issued and fully paid up. Mortgages and charges, nil.

**Magnoid (Bristol), Ltd.**—Capital, £1,000 in 600 preference and 400 ordinary shares of £1. Return dated March 8th, 1931. All shares taken up. £400 paid on 400 ordinary shares, £600 considered as paid on 600 preference shares. Mortgages and charges, nil.

**H. J. Bartlett (Hove), Ltd.**—Capital, £2,000 in £1 shares. Return dated June 1st, 1931. 1,250 shares taken up. £851 paid, £399 considered as paid. Mortgages and charges, nil.

**Capels Wholesale Wireless Co., Ltd.**—Capital, £1,000 in £1 shares. Return dated December 31st, 1930 (filed April 23rd, 1931). 1,000 shares taken up. £1,000 paid. Mortgages and charges: £2,000.

**Essex Radio Supplies, Ltd.**—Capital, £1,500 in £1 shares. Return dated October 24th, 1930 (filed March 4th, 1931). 500 shares taken up. £500 paid. Mortgages and charges, nil.

**Gibrico Electric, Ltd.**—Capital, £1,000 in £1 shares. Return dated December 31st, 1930 (filed April 29th, 1931). 800 shares taken up. £400 paid, £400 considered as paid. Mortgages and charges, nil.

**Hall Telephone Accessories (1928), Ltd.**—Capital, £250,000 in 10s. shares. Return dated February 26th, 1931. 378,000 shares taken up. £69,588 10s. paid, £119,411 10s. considered as paid. Mortgages and charges, nil.

**Moreland Electric Welding Co., Ltd.**—Capital, £4,000 in £1 shares. Return dated July 18th, 1930 (filed April 24th, 1931). 2,302 shares taken up. £2,202 paid, leaving £100 in arrears. Mortgages and charges, nil.

**Johnson & Tanner, Ltd.**—Mortgage on 2, Park Terrace, Worcester Park, Surrey, dated June 6th, 1931, to secure all moneys due or to become due from the company to Lloyds Bank, Ltd., not exceeding £300.

**S. Kalisky (Aldgate), Ltd.**—Capital, £1,000 in £1 shares. Return dated November 28th, 1930 (filed April 16th, 1931). All shares taken up. £1,000 paid. Mortgages and charges: £4,000.

**Metropolitan Electric Cable & Construction Co., Ltd.**—Capital, £75,000 in 10s. shares. Return dated February 19th, 1931. 120,000 shares taken up. £59,900 paid, £100 considered as paid. Mortgages and charges, nil.

**Electric Transmission, Ltd.**—Capital, £10,000 in £1 shares. Return dated March 5th, 1931. 5,000 shares taken up. £5,000 paid. Mortgages and charges, nil.

**Lamp Manufacturing Co., Ltd.**—Capital, £10,000 in £1 shares. Return dated February 12th, 1931. 5,400 shares taken up. £5,400 paid. Mortgages and charges: £2,500 debentures.

**Shardlow Electric Wires, Ltd.**—S. I. Wallis, of 3, King Johns Chambers, Bridlesmith Gate, Nottingham, ceased to act as receiver and manager on May 27th.

**Campbell & Addison, Ltd.**—Issue on June 3rd of £500 and on June 19th of £400 debentures, parts of a series already registered.

**Electric Light Insurance & Maintenance Co., Ltd.**—Issue on May 18th of £100 and on June 22nd, 1931, of £270 second mortgage debentures, parts of a series already registered.

**Newcastle-upon-Tyne Electric Supply Co., Ltd.**—Satisfaction to the extent of £1,976,000 on various dates between November 23rd, 1927, and June 12th, 1931, of second mortgage debenture stock secured by trust deeds and supplemental trust deeds dated October 16th, 1913, to April 8th, 1927, and registered on various dates from October 29th, 1913, to April 26th, 1927, securing £2,000,000. The balance, £24,000, has not been issued.

**Banbury & District Electric Supply Co., Ltd.**—Capital, £50,000 in £10 shares. Return dated March 26th, 1931. All shares taken up. £25,000 paid. £25,000 considered as paid. Mortgages and charges, nil.

**Kidderminster & District Electric Supply Co., Ltd.**—Capital, £100,000 in 5,000 preference and 5,000 ordinary shares of £10 each. Return dated March 26th, 1931. 5,000 preference and 4,700 ordinary shares taken up. £97,000 paid. Mortgages and charges, nil.

**Power Securities Corporation, Ltd.**—Capital, £2,000,000 in 1,000,000 preference and 1,000,000 ordinary shares of £1 each. Return dated March 2nd, 1931. 500,000 preference and 500,000 ordinary shares taken up. £1,000,000 paid. Mortgages and charges, nil.

**Willmott, Son & Phillips, Ltd.**—Capital, £1,000 in £1 shares. Return dated May 20th, 1931. 501 shares taken up. £501 paid. Mortgages and charges, nil.

# City Notes

## General Electric Co., Ltd.

The accounts of this company were abstracted in our last issue (p. 1105), and the annual meeting was held on June 30th. Sir Hugo Hirst (chairman), who presided, in the course of his speech, said that although the year's result was not another record, it was the best year in the company's history with the exception of last year. The total amount of sales had been practically the same as that of last year. As a matter of fact, they had increased the number of transactions, but the average value per transaction proved less, thus causing a slight increase in the percentage of overhead charges. This, combined with a drop in prices, was responsible for the slight set-back which they had experienced. Freehold and leasehold land and building account had been increased during the year by £300,175, that amount having been spent for the acquisition of a site at the back of Magnet House, and various extensions to the Union works, telephone works, Witton works, the Research Laboratories, and more particularly to additional Osram works at Wembley. They had during the year also increased their investment in the Express Lift Co. and the General Electric de France, and had taken a financial interest in the Hecla Company of Melbourne. The increase in shares and debentures in associated companies was due to an additional investment in the Pirelli-General Cable Works and the launching of Claude-General Neon Lights, Ltd. Already the Air Ministry had placed important contracts through the G.E.C. with Claude-General for neon beacons, and the company was also carrying out a large contract for the Croydon aerodrome for luminous devices connected with the safe landing of aeroplanes during fog. There were indications that other and more important developments would result. In the list of manufacturing companies, Chamberlain & Hookham, the Express Lift Co., the Oriental Tube Co., Salford Electrical Instruments, Ltd., and Lemington Glass Works, Ltd., were companies which they absolutely controlled. The other companies, Bushing Co., Lamp Caps, Ltd., M.-O. Valve Co., Pirelli-General and Siemens-G.E.C., were companies which they owned in partnership with other electrical interests, and they had all been working satisfactorily. As regarded trading companies, the first four on the list showed this year a loss, due to falling exchanges, as in Argentina and China, or to the special conditions prevailing, as in Australia. The General Electric de France and the General Electric Co. of India had made profits, and the Reliance Telephone Co. had become quite a useful and profitable adjunct. As regarded the new list of supply companies, they had followed the example of other big electrical companies to secure for themselves special fields for exploitation, with a view to finding an outlet for their manufactures. With their usual conservative principles they would proceed within the limits of their free finances and, by nursing well-selected districts, felt confident that in the course of a few years they would have such yields that the Electrical Development & Securities Trust, Ltd., which comprised all these concerns, could finance itself without further drain on their finances. They had used the present period of depression in searching for new fields to conquer, and for further technical research. As a result, they had succeeded in getting important contracts for the further development of the grid, which in some way compensated them for the decline in orders in turbines and turbo-generators. Work for the grid meant very largely switch and control gear of 1,000,000-kVA breaking capacity. It included construction of 130-kV outdoor 3-phase oil-circuit breakers, transformers, &c. For the purpose of testing this apparatus it was necessary to construct a special high-voltage laboratory at Witton. Turbo-alternators, of 40,000 kVA at both 1,500 and 3,000 r.p.m. had been supplied and given satisfaction to Battersea and Birmingham Corporations. The satisfactory result obtained in the complete electrification of a cement-carrying vessel for Canada had helped them to secure further contracts in this direction, including the *Monarch of Bermuda*. They had been successful in developing mercury rectifiers, and had secured contracts from the L.M.S. as well as the Underground Railway. Equally so, progress had been made in the construction of transformers, and a number of 30,000-kVA 3-phase transformers were now going through their works. Several Diesel electric locomotives had been completed during the year and shipped for the Indian State Railways. They had also supplied 56 motor coaches for the Buenos Aires Central Terminal Railways, and the electrification of the Altrincham line—the first suburban railway to be operated at 1,500 V d.c. had been an outstanding success. Further progress had been made in the telephone field, and orders had been secured for many automatic exchanges at home, as well as for Kenya and the Straits Settlements. Particular success had attended a special type of rural automatic exchange equipment. In radio, both in sets and valves, further progress had been made. The success of the Pirelli-General Cable Works, particularly in oil-filled cables, had brought them into the front rank of cable makers of the world. Special studies had been made for the lighting of cinemas, aerodromes, and streets, and flood-lighting illumination bade fair to become a science, as well as an industry on its own. They had made further progress in the development of new alloys for heating elements, in industrial and domestic water-heating and industrial electric furnaces. Their efforts in export had been unabated, although they had to admit to a considerable set-back in volume during the last year. Difficulties had been created by political troubles in South American states, in India and China, and finally their chief market—Australia—had for the time practically closed her doors to their products by prohibitive tariffs and by her desire to produce certain electrical commodities. They had taken advantage of this desire by interesting themselves, jointly with others, in a lamp factory in Australia and by acquiring an interest in the Hecla Co. Personal representatives had been sent to a number of countries with a view to opening trade. They had ventured to do trade on the Continent in certain specialities, not without success, and they had been prominent amongst the manufacturers of this country to make a dignified display in the Buenos Aires Exhibition. Some of their shops and departments had been badly hit through the stagnation in the basic industries, but there were a great number of new industries existing and constantly in the making, which offered a great field to the electrical people of this country. In spite of the depression the country was employing more people in industry to-day than it did in 1924, the best post-war year for employment. On the whole, we could compare favourably to-day with any country in the world. If something were to happen to give new hope to this dispirited world, enterprise would get a fillip, we might even march on the road to prosperity. Electrical people had no reason to be downhearted. Electricity had ceased to be a luxury; current and commodities were getting cheaper. The field of the electrical industry laid to-day much more in the office, the shop, the farm and the worker's cottage, than in the palace. If the industry aimed at cheap electricity supply, the manufacturers aimed at standardisation and mass production. The field for a generation or two was inexhaustible. The success of the grid would be more assured if the recent report on railway electrification was acted upon. Only electrical service could meet post-war demands. A way could be found to finance the scheme, so that no fear of nationalisation need arise. By pooling the railway supply with the general electricity output, electricity could be supplied as cheaply as, or cheaper, than in any country liberally provided with water power. The benefit of the grid and cheaper power could be given not only to the industrial part of the country, but to every section of the country. The uses of electricity on the farm were increasing daily, and electricity would play a great part in the development of agriculture. By spreading the grid with the help of the railways into every part of the country, cheap electricity could be tapped anywhere, and the all-electric home would become a reality all over the country. Industries could be started without driving people into our overcrowded towns, and altogether he visualised a position created that would enable us to challenge the world again for industrial supremacy. With such an outlook the opportunities of the G.E.C. were unlimited.

## Globe Telegraph & Trust Co., Ltd.

The annual meeting was held on June 29th, Lord Midleton (chairman) presiding. In presenting the report and accounts (ELEC. REV., June 26th, p. 1106), the chairman said that in view of the present unparalleled expenditure of the country, and the absence of any agreement among parties to reduce the burden of income tax, the directors felt it right to warn shareholders that the question of paying future dividends less tax might have to be considered seriously. The American Telegraph and Cable Co. and the Indo-European Telegraph Co. shares, which were sold last year, accounted for a reduction of £5,900 in the year's receipts, and they had suffered reductions in dividends from the Telegraph Construction and Maintenance Co. and the Postal Telegraph and Cable Corporation amounting to £4,300, which with £8,000 additional income tax had caused a reduction of income of £18,000, which by re-investment had been reduced to £6,270. The prosperity of the company had been built up on the large holding in the old cable companies, and still depended on the income received from Cables and Wireless, Ltd., into which those holdings were converted. Referring to the Cables and Wireless merger, the chairman said that for two years past the merger had unfortunately been faced by the unexampled slump in trade. Possibly this universal fall in receipts might induce a more sympathetic attitude by the Governments of the Empire, than had been the case in the last two years. It appeared that the traffics of the Beam rented from the Government at £250,000 annually, hardly justified the acquisition, having regard to the fact that the transfer of the Beam stations was accompanied by the condition that the company should also maintain a number of cables which now existed purely for strategical reasons. The report and accounts were adopted.

## W. T. Henley's Telegraph Works, Co., Ltd.

The accounts for the year ended March 31st last show a profit of £349,089, as compared with £374,264 in the preceding year. After deducting debenture interest, &c., and adding £572,630 brought forward, there is a total of £849,074 available. Reserve again receives £50,000 and £20,000 is set aside for provision for obsolescence of lead presses. The directors recommend a final dividend of 2s. 6d. per share on the ordinary shares, less tax, making 4s. for the year, and also propose a cash bonus of 2s. per share, less tax, leaving £567,187 to be carried forward. The report states that during the year there has been a continuous fall in the prices of materials which the company uses in its manufactures, and this depreciation in value has been met out of reserves previously established for such an eventuality. Owing to the disturbed conditions abroad, losses may be made in connection with considerable sums of money which the company holds at its overseas

branches, and a reserve has been made to provide for any such possible losses. The subsidiary, Henley's Tyre & Rubber Co., Ltd., has made a satisfactory profit. Meeting: July 10th.

### Power Investment Corporation, Ltd.

Presiding at the annual meeting on June 23rd, Mr. R. O. Hambro (chairman), in the course of his speech, said that although they had made profits on the realisation of investments, which, while they were a finance company, were in the ordinary course brought into the revenue account, their business had been conducted during the last three years on the same lines as an ordinary investment trust. In view of this, and the fact that they felt that the possibilities of doing successful finance company business in the near future were likely to be small, it was thought better to take steps to convert the company definitely into an investment trust. Their investments were well distributed, 26 per cent. being in Great Britain and the Colonies, 9 per cent. in the United States and Canada, 30 per cent. in Germany and Central Europe, 5 per cent. in Scandinavia, 5 per cent. in Greece and the Balkans, 11 per cent in South America, and the remainder in various parts of the world. The report and accounts were adopted and at a subsequent extraordinary general meeting, resolutions were passed approving the conversion of the company into an investment trust.

### Ward and Goldstone, Ltd.

The report for the year ended March 31st last shows a net profit of £19,882, and after deducting income tax, depreciation, &c., and adding £23,139 brought forward, there is a balance of £33,865 available. It is proposed to place £10,000 to general reserve, and to pay a final dividend of 7 per cent., less tax, on the ordinary shares for the year, leaving £16,107 to be carried forward. The report states that the heavy losses incurred by the continued falls in copper, rubber, and cotton, the principal raw materials used, have been provided for out of revenue. In spite of keen competition the output of electrical wires, cables, and components exceeded that of previous years. Meeting: July 8th.

### Electrical & Radio Products, Ltd.

In our issue of June 12th (p. 1001) we referred to the application for the compulsory winding-up of this company, which was adjourned for four weeks. We have now received a circular issued to unsecued creditors giving particulars of a scheme of arrangement. Under this scheme a new company entitled Electrical and Radio Products (1931), Ltd., is to be formed, with a capital of £20.924 in 436.969 redeemable preference shares of 6d. each and 40,000 ordinary shares of 5s. each. Distribution of profits by way of dividend is to be applied in payment to the holders of the redeemable preference shares of a non-cumulative preferential dividend at the rate of 7½ per cent. per annum, such dividend to commence to be payable in the financial year 1934/35, and, subject thereto, the profits determined to be distributed by way of dividend shall be distributed among the ordinary shareholders in proportion to the capital paid up thereon. The new company will take over the assets of the existing company in consideration for £17,225, and the right of the present shareholders to the allotment of one redeemable preference share for every three shares now held. The sum of £17,225 will be satisfied as to £3,000 in cash, and the balance by the allotment to the liquidator, or his nominees, of an "A" first debenture to the nominal amount of approximately £4,225, and "B" first debentures to the nominal amount of £10.000. Meetings of creditors are to be held on July 9th at Winchester House, Old Broad Street, E.C., to consider the scheme.

### Haslam & Newton, Ltd.

Presiding at the annual meeting on June 30th, Mr. C. A. Newton (chairman), in referring to the holdings in subsidiary companies, said that Derby Cables was a substantial source of revenue to them. With regard to the Newton, or electrical, side of the works, this section had had its slack period, but a considerable amount of work was expected from certain Government departments and the like users of this class of plant and machinery, and several lines of development which showed promise of remunerative returns were being undertaken. The general slump in business had been great and persistent, but they had secured more than their share of available business. The report and accounts were adopted.

---

According to the *Financial News* an extraordinary general meeting of the *Jerusalem Electric and Public Service Corporation* is to be held to-day (Friday) in Jerusalem for the purpose of considering a resolution that the directors be at liberty to issue 120,000 shares of £P.1 each of the ordinary capital for the time being unissued as 7 per cent. cumulative preference shares to rank, *pari passu*, in all respects with the existing 7 per cent. cumulative preference shares.

The report of *Whitehall Electric Investments, Ltd.*, for the year ended March 31st last shows a net profit of £443,142, as compared with £449,883 in the preceding year. The dividend on the ordinary shares is maintained at 5 per cent. and the balance carried forward is increased from £112.783 to £118,426. Investments held by the company and by Hallminster Investments, Ltd., and Whitehall, Canada, Ltd., in which the company owns 85 per cent. of the share capital, have a book cost of £12,831,894. The value of these investments at March 31st last showed a depreciation of £653,702. The company has acquired during the year an interest in an electrical undertaking in Spain.

In its annual report for 1930, the *Associated Gas and Electric Co.* shows net earnings of $20,948,944, against $18,743,883 for the previous year. After paying all fixed and interest charges, earnings were equivalent to $2.30 per share on the average number of Class A shares outstanding during the year. During the year 41,130 new customers were connected, bringing the total number served up to 1,122,167, and the output of electricity increased by 1.4 per cent.

The net revenue of the *Electric & General Investment Co., Ltd.*, for the year ended May 31st last amounted to £6,962, to which is added £20,563 brought forward, making £27,525. A final ordinary dividend of 5 per cent. is recommended, making 10 per cent. (same), but the distribution on the deferred shares is reduced from 2s. to 1s. The balance carried forward is £18,280.

The report of the *Mansfield and District Tramways, Ltd.*, for 1930 shows a balance at credit of revenue account, including £1,190 brought forward, of £5,100, and after deducting debenture interest, &c., there is a debit balance of £1,772, which has been written off against reserve.

An extraordinary meeting of shareholders of the *North Metropolitan Electric Power Supply Co.* was to be held on July 2nd to consider a resolution that additional capital be raised by the creation and issue of 100,000 ordinary £1 shares, ranking for dividend as from January 1st, 1931. The company has made an offer to the stockholders of the Bishop's Stortford, Harlow, and Epping Gas and Electricity Co. to buy their ordinary and preference stock, and it is for this purpose that the new capital is required.

Speaking at the annual meeting of *Greenwood & Batley, Ltd.*, Col. O. C. Armstrong (chairman) said that last year he indicated that there seemed justification for hoping trade might improve in 1930-31. Far from this proving the case, insofar as they were concerned, this particular year stood out as the leanest of the meagre years since 1922. The balance sheets of the company had for many years shown great financial strength, and the one now presented maintained that position.

The directors of the *Barcelona Traction, Light and Power Co.* have announced that owing to present conditions in Spain and the serious fluctuation and depreciation of the peseta, the board has decided that the question of the payment of a dividend on the ordinary shares must be deferred until the end of the financial year, and accordingly the interim dividend which normally would have been declared in June will not be paid.

The directors of the *Kensington and Knightsbridge Electric Lighting Co., Ltd.*, have declared an interim dividend of 9d. per share, less tax, on the ordinary shares.

The *London Electric Wire Co. and Smiths, Ltd.*, has declared an interim dividend of 3d. per share, less tax, on the ordinary shares (same).

## Stocks and Shares

TUESDAY EVENING.

THE remarkable change effected by the proposal of President Hoover in regard to the moratorium of one year for war debts continues to be an outstanding feature of the Stock Exchange markets. Mention was made here last week of the electrical effect which this produced upon prices when the plan was first published. A miniature boomlet in prices ensued, not accompanied, however, by any great expansion of business on the part of the public. After a slight reaction, the forward movement was resumed, and in spite of mild apprehensions expressed in regard to the possibilities of French reluctance to join in the plan, Stock Exchange markets retained their robust appearance. Aided by occasional spurts of strength from America, the lists in practically every department continued to forge ahead. The oversold condition of markets enables stock to be placed at good prices when it comes in. The aspect is considered to be completely changed. Instead of being plunged into profound depression, Stock Exchange markets are presenting a cheerfulness which, a fortnight ago, would have seemed to be impossible under any consideration short of that of complete cancellation of war debts. It is generally recognised that the pace set by a good many of the leading favourites may prove to have been too fast, and the opinion is constantly heard in the City that, with the summer at hand, the usual lassitude common to the season may have the effect of bringing about reaction from the best.

### Home Electricity Supply

Seeing that the market for home electricity supply shares is one of the very few which, during the whole of the depression, held its prices, and improved in a number of cases, it is hardly to be expected that the changed conditions in other parts of the House should have any particular influence over these shares. City of London ordinary have strengthened to 37s., and County ordinary to 45s. 9d. London Electric preference rose to 6 1/16. Central Electricity 4½ per cent. debenture is quoted lower at 98½; London and Home Counties 4½ per cent. debenture has gone back to a similar figure.

### Provincial Electrical Issues

Lancashire Light and Power shares improved to 21s. 3d., and Yorkshires to 31s. 3d. Newcastle-on Tyne ordinary recovered to 22s. 6d. Midland Electric Power shares are again

higher at 28s. 3d. Clyde Valleys at 32s. 9d. are 1s. 9d. better. Northamptons are steady at 38s. 6d., and Richmond (Surrey) shares at £2. North Metropolitans have risen to 32s. 9d. on the company's proposal to create 100,000 new ordinary shares ranking for dividend as from January 1st next. The meeting to carry the resolutions into effect is being held on Thursday in this week.

Newcastle and District second debentures at 102½ are 2 higher, and West Gloucestershire preference is a point up at 75½. Cornwall Power preference improved to 21s. 3d. Electrical Finance at 45s. are 1/16 down. Llanelly and District ordinary shares strengthened to 13s. 9d.

## Tube Stocks

Home Railway steam stocks have been going ahead by leaps and bounds. The rises were largely due to the endeavours to buy back their stock by people who had been short of it. Hopes are also current that the trouble in the coal mining area may be settled pacifically. The friction which prevailed in the coal trade had led to disquietude in the matter of its possible spreading to the railway companies, but, for the moment, appearances suggest that the prospect of an open rupture has been averted. Underground £1 shares are better at 22s.

The terms under which stocks of the Underground group are to be handed over to the London Passenger Transport Board have been circulated, and meetings were called for Wednesday, July 1st, in order to obtain approval of the stockholders to the proposed alterations. The three stocks to be issued in exchange for the existing securities will be London Passenger Transport "A," "B," and "C" stocks. Sir William MacLintock, the Government adviser, has worked out estimates of the probable revenue at the disposal of the Board, which estimates have been placed before the Joint Committee of both Houses of Parliament.

## Cables and Wireless

Cables & Wireless 5½ per cent. preference stock rose from 52½ to 61½, as mentioned here last week, and then reacted to 57½. Around this latter price a considerable amount of speculation has revolved. On that revival of trade which, according to expectation, President Hoover's moratorium proposals are likely to bring about, the communication industry should be amongst the first to benefit. On this theory, speculative buying of the preference and the "A" ordinary stocks went on merrily, but stock has been forthcoming, and the net result is that no alteration has occurred in the preference, the "A" and "B" ordinary both being a point or so higher. Globe Telegraph & Trust ordinary fell back to 8½: the preference improved to 9½. Great Northern Telegraphs are 30s. up at 27. Marconi Marines rose to 37s. American Telephone & Telegraph at 35½ xd is the fraction better. Western Union common stock at 125 has added 5 points to its gain of 10 last week. Telephone Manufacturing (1929), at 2s. 3d., are a few pence harder.

## Dollar Stocks

Important advances in the stocks of the Mexican group stand out amongst the features in the dollar issues. Mexican Light & Power common shares rose 13 to 45½, the preferred, at 71½, being 7 better, while the first mortgage bonds have risen to 75½. The report, mentioned in last week's issue, is taken to throw a gleam of light upon what had previously been regarded as a somewhat obscure position, and, there being little supply of stock in the market, the spurt in the common shares occurred to the accompaniment of very little business. The rise to 22 in Brazil Tractions took place, on the other hand, on many thousands of shares changing hands. The bears both here and in America have been badly smitten. Affairs in Brazil are deemed to have assumed a more cheerful complexion on the statement, made a few days ago, to the effect that some of the American banks are taking a close interest in Brazilian finance. The substantial rises which have occurred in Brazilian Government bonds served to bring about a welcome change in the financial outlook for the utility companies. Power Corporation of Canada rose 3½ to 49½. Shawinigans are 2 better at 44½.

Of the sterling stocks, Argentine Tramways 5 per cent. debenture stock is harder at 22½.

## Manufacturing and Equipment

General Electric ordinary, which rose 3s. 6d. last week, are 3s. 9d. further to the good at 43s. 9d. At this price, the yield on the money is £4 11s. 6d. per cent. The reduction in the dividend has done, therefore, good to the price of the shares rather than harm, and the meeting was considered satisfactory. Associated Electrical Industries ordinary shares, at 21s. 3d., are 1s. 9d. up, the yield at the present price being £5 13s. The group as a whole shows up well. Henleys, after their 10s. rise of last week, are 2s. 6d. better at 5½. Callender's, at 56s. 3d. ex dividend, are practically 3s. up. British Aluminium show a gain of 3/16 at 28s. 9d. Enfields have strengthened to £4, and Siemens to 23s. 9d. No changes have occurred in British Insulated ordinary at 2½, or in Brush ordinary at 60. Rubber shares brightened, on a temporary rise in the price of the product. Babcock and Wilcox went up ½ to 47s. 6d., and Imperial Chemicals to 16s. before the latter reverted to 15s. 3d.

British Electric Traction deferred, at 900, is ex both the cash dividend and the stock bonus.

# Share List of Electrical Companies

### Home Electricity Companies

| | Nom. | Approx. Dividend 1929. | 1930. | Price June 30 1931. | Rise or fall. | Yield p.c. |
|---|---|---|---|---|---|---|
| | £ | | | | | |
| Bournemouth and Poole ... ... | 1 | 15 | 15 | 58/9 | — | 5 2 2 |
| Brompton Ordinary ... ... | 1 | 8½ | 8½ | 28/6 | — | 4 18 3 |
| Central Electricity 4½% Deb. ... | Stock | — | 4½ | 98½ | −½ | 4 11 6 |
| Charing Cross Ordinary ... ... | 1 | 8½ | 8½ | 30/- | — | 4 13 4 |
| Chelsea ... ... ... ... ... | 1 | 8¾ | 8¾ | 27/6 | — | 5 1 10 |
| City of London ... ... ... | 1 | 10 | 10 | 37/- | +9d. | 5 8 1 |
| Clyde Valley ... ... ... ... | 1 | 8 | 8 | 33/9 | +1/9 | 4 14 10 |
| County of London ... ... ... | 1 | 7 | 10 | 45/9 | +9d. | 4 7 4 |
| Edmundsons' 7% Pref. ... ... | 1 | 7 | 7 | 25/6 | — | 5 9 10 |
| Elec. Supply Corporation ... ... | 1 | 11 | 11 | 43/9 | +1/6 | 5 0 6 |
| Kensington Ordinary ... ... | 1 | 8 | 8 | 30/- | — | 4 13 4 |
| Lancs. Light and Power ... ... | 1 | 7 | 6½ | 21/3 | +6d. | 6 3 4 |
| London & Home Counties 4½% Deb. | Stock | — | — | 98½ | −½ | 4 11 6 |
| London Electric ... ... ... | 1 | 8½ | 9 | 34/- | — | 5 5 11 |
| Metropolitan ... ... ... ... | 1 | 9 | 10 | 39/3 | — | 5 1 11 |
| Midland Counties ... ... ... | 1 | 6½ | 7 | 27/6 | +1/6 | 5 1 10 |
| Mid. Elec. Power ... ... ... | 1 | 15 | 8 | 28/9 | +9d. | 5 13 3 |
| Newcastle-on-Tyne Ordinary ... | 1 | 6 | 6 | 22/6 | +1/6 | 5 6 8 |
| do. 7% Pref. ... ... | 1 | 7 | 7 | 27/- | — | 5 3 8 |
| Notting Hill 6% Pref. ... ... | 10 | 6 | 6 | 11½ | — | 5 6 8 |
| North Met. Elec. 6% Pref.... | 1 | 6 | 6 | 24/- | — | 5 0 0 |
| St. James' and Pall Mall ... ... | 1 | 8 | 8 | 29/- | — | 4 16 7 |
| Scottish Power ... ... ... | 1 | 8 | 8 | 28/9 | — | 5 11 5 |
| South London ... ... ... ... | 1 | 8½ | 8½ | 27/6 | — | 5 1 10 |
| Urban Ordinary ... ... ... | 1 | 7 | 7 | 27/6 | — | 5 1 10 |
| Westminster Ordinary ... ... | 1 | 8½ | 8½ | 29/- | — | 4 16 7 |
| Whitehall Elec. Invst. 7½% Pref.... | 1 | 7½ | 7½ | 24/6 | — | 6 2 5 |
| Yorkshire Elec. ... ... ... | 1 | 8 | 8 | 31/3 | +1/6 | 5 2 5 |

### Home Rails

| | | | | | | |
|---|---|---|---|---|---|---|
| Central London Ord. Assented ... | Stock | 4 | 4 | 76 | — | 5 5 3 |
| Metropolitan ... ... ... ... | ,, | 4 | 9½ | 48½ | — | 7 4 4 |
| do. District ... ... | ,, | 5 | 5 | 64½ | — | 7 15 0 |
| Underground Electric ... ... | £1 | 8 | | 22/- | +6d. | 7 5 6 |

### Telegraphs and Telephones

| | | | | | | |
|---|---|---|---|---|---|---|
| Anglo-Am. Tel. Pref.... ... ... | Stock | 6 | 6 | 104½ | — | 5 14 10 |
| do. Def- ... ... ... | ,, | 1½ | 1½ | 25 | — | 6 0 0 |
| Automatic Telephone ... ... | 1 | 12½ | 12½ | 32/6 | — | 7 18 10 |
| Cables & Wireless 5½% Pref. ... | Stock | 5½ | 5½ | 57½ | — | 9 11 4 |
| do. A 7½% Ord. ... ... | ,, | Nil | — | 18 | +2 | ... ... |
| do. B Ord. ... ... | ,, | Nil | — | 11 | +1 | ... ... |
| Globe Tel. and T. Ord. ... ... | 10 | 10 | 8½ | 8½ | −½ | *10 0 0 |
| do. do. Pref. ... ... | 10 | 6 | 6 | 9½ | +½ | 6 6 4 |
| Great Northern Tel. ... ... | 10 | 20 | 20 | 27 | +1½ | 7 8 2 |
| Marconi-Marine ... ... ... | 1 | 15 | 15 | 37 | +3/3 | 8 2 2 |
| Oriental Telephone Ord. ... ... | 1 | 12 | 12 | 2½ | — | *5 6 6 |

### Home and Foreign Trams, &c.

| | | | | | | |
|---|---|---|---|---|---|---|
| Anglo-Arg. Trams First Pref. ... | 5 | 5½ | — | 12/6 | — | ... ... |
| do. do. 2nd Pref. ... | 5 | 6 | — | 7/6 | — | ... ... |
| do. do. 5% Deb. ... | Stock | 5 | 5 | 22½ | +1 | 22 4 2 |
| British Electric Traction Def. Ord. | ,, | 5 | 5 | 900xd | — | ... ... |
| do. do. Pref. Ord. ... | ,, | 8 | 8 | 126½xd | +3 | 6 9 7 |
| Brazil Traction ... ... ... | 100 | 8 | — | 22 | +3½ | ... ... |
| Brit. Columbia Elec. Rly. Pce. ... | Stock | 5 | 5 | 97½ | — | 5 2 7 |
| London & Sub. Trac. 5% Pref. ... | 1 | Nil | Nil | 11/6 | — | ... ... |
| London United Tram Deb. ... | Stock | 4 | 4 | 62½xd | +1½ | 6 8 0 |
| Mexico Trams, 5% Bonds ... ... | — | 5 | 5 | 42½ | — | 11 15 4 |
| Mexican Light Common ... ... | 100 | Nil | Nil | 46½ | +14 | ... ... |
| do. 7% Pref. ... ... ... | 100 | 7 | 7 | 71½ | +7 | 9 15 10 |
| do. 1st Bonds ... ... ... | — | 5 | 5 | 75½ | +1½ | 6 12 5 |
| Victoria Falls Ord. ... ... ... | 1 | 15 | 15 | 58/3 | +9d. | 5 3 0 |
| Yorkshire (West Riding) ... ... | | Nil | Nil | 5/6 | — | ... ... |

### Manufacturing Companies

| | | | | | | |
|---|---|---|---|---|---|---|
| Assoc. Elec. Ord. ... ... ... | 1 | 6 | 6 | 21/3 | +1/9 | 5 13 0 |
| do. Pref. ... ... ... | 1 | 8 | 8 | 28/3 | +9d. | 5 13 0 |
| Babcock & Wilcox ... ... ... | 1 | 15 | 14 | 47/6 | +2/6 | *5 7 8 |
| British Aluminium Ord. ... ... | 1 | 10 | 10 | 28/9 | +3/9 | 6 19 2 |
| British Insulated Ord. ... ... | 1 | 15 | 15 | 42 | — | 5 9 1 |
| Brush Ord. ... ... ... ... | Stock | 10 | 5 | 60 | — | 8 6 0 |
| Callenders ... ... ... ... | 1 | 15 | 15 | 21½xd | +3/- | 5 6 9 |
| do. 6½% Pref.... ... ... | ... | 6½ | 6½ | 25/-xd | +6d. | 5 4 0 |
| Crompton Parkinson Ord. ... ... | 5/- | 20 | 20 | ½ | — | 8 11 5 |
| do. 8% Pref. ... ... ... | 1 | 8 | 8 | 28/- | — | 5 14 5 |
| Edison-Swan 1st Pref. ... ... | 1 | 7½ | 7½ | 23/9 | — | 6 6 4 |
| do. 5% Deb. ... ... | Stock | 5 | 5 | 99½xd | −2 | 5 8 1 |
| Electric Construction ... ... | 1 | 5 | Nil | 11/3 | — | ... ... |
| Enfield Cable Ord. ... ... | 1 | 25 | 25 | 4 | +½ | 6 5 0 |
| English Electric ... ... ... | 1 | Nil | Nil | 5/- | — | ... ... |
| do. do. Pref. ... ... | 1 | Nil | Nil | 5/- | — | ... ... |
| Ferranti Pref. ... ... ... | 1 | 7 | 7 | 20/6xd | — | 6 16 7 |
| G.E.C. Pref. ... ... ... | 1 | 6½ | 6½ | 19/6 | −6d. | 5 2 0 |
| do. Ord. ... ... ... | 1 | 14 | 10 | 43/9 | +3/9 | 4 12 6 |
| Henley ... ... ... ... | 1 | 20 | 20 | 5½ | +½ | 5 9 1 |
| do. 4½% Pref. ... ... | 5 | 4½ | 4½ | 4½ | — | 5 2 10 |
| India-Rubber ... ... ... | 1 | Nil | Nil | 4/6 | — | ... ... |
| Johnson & Phillips ... ... ... | 1 | 10 | 10 | 28/9 | — | 6 19 2 |
| Siemens Ord. ... ... ... | 1 | 7½ | 7½ | 23/9 | +1/- | 6 6 4 |
| Telegraph Construction ... ... | 12 | 10 | 7½ | 13½ | −½ | 7 8 10 |

*Dividends paid free of Income Tax.

# Domestic Appliances in Brazil

## Immediate Prospects not Favourable

A CONFIDENTIAL report on the market for domestic electrical appliances in Brazil, based on information supplied by the Commercial Secretary to the British Embassy at Rio de Janeiro and consular officers at Pará and Pernambuco, has recently been issued by the Department of Overseas Trade.

It is stated that the country is a market of great potentiality and enjoys an excellent strategic position in the new world, a large population and great natural wealth and fertility. Owing, however, to a variety of reasons, the Republic is now as it has been for many years, except for brief periods of prosperity, in a state of arrested development. The position to-day is worse than it has been for some years. National credit is to-day at a record low ebb; exchange is falling and the gold backing of the currency has gone. Amongst the vast body of workers purchasing power has always been low, and these have, in general, never reached that point of prosperity at which they take a share in the demand for electrical appliances. The relative cheapness of manual labour and the rather indifferent quality of the labour available, both go far to vitiate the usual advantages of labour-saving devices. No doubt some improvement and development will take place but it is likely to be slow.

### The Influence of Electricity Undertakings

By a variety of means the suppliers of power and light are in a position to influence the sales of domestic electrical appliances. In Brazil electrical public utility ownership is mainly shared by two groups—namely, the Electric Bond & Share Co. and the Brazilian Traction Co. During the past few years the former has acquired control of a large number of city power and lighting plants, and until recently has been extending its control by means of its Brazilian subsidiary, the Companhia Brazileira de Força Electrica. Its operations and expansion have recently been checked by the depression in the United States and by the disastrous decline in Brazilian exchange, but the effect of the extended control has naturally been to the advantage of the associated American manufacturers. The second group mentioned above, namely, the Brazilian Traction Co., is by far the most important in the country and controls under the names of the Rio de Janeiro Tramway, Light and Power Co., and the Sao Paulo Tramway, Light & Power Co., the electrical utilities of the districts of Rio de Janeiro and Sao Paulo, which are the richest and most populous districts in the whole country. Almost half the stations supply at a pressure of 120 V, while approximately a quarter give supplies at 220 V.

### Requirements of the Market

Electric lamps, accumulators, insulation material and insulators up to 11,000 V, copper wire, and a few radio sets are made in Brazil, but there are not known to be any factories producing the complete domestic appliances dealt with in the report. Owing to the climate, which is tropical or sub-tropical, the demand for electric radiators, fires, and water-heaters is very small. With the possible exception of São Paulo, which is cool in the evening owing to its high altitude, and Southern Brazil, there is no necessity for heating in residences. The high rates charged for electricity discourage the use of electric cookers, and gas and petrol stoves are most commonly used.

Owing to the cheapness of domestic labour—and the reluctance of most Brazilian servants to use electrical apparatus—vacuum cleaners are not making much progress. Electric floor polishers are, however, used for cleaning parquet floors in many cases.

Of the small domestic apparatus fans are undoubtedly in chief demand. Electric irons are also very common and are increasing. Kettles, grillers, and boilers are little used owing to the difficulty of competition with gas.

Information with regard to the extent of the demand and the sources of supply to be obtained from the Brazilian import trade returns is extremely meagre, owing to the lack of detail in the classifications. The only item classified separately is " electric flat-irons " the imports of which in 1929 amounted to 213 metric tons in quantity and £23,458 in value, a 50 per cent. increase as compared with the previous year.

Import duties are as follows:—Electric irons, stoves, and similar apparatus, *ad valorem* 15 per cent.; fans, 1$000 per kilo; electrical machines and apparatus not specified, 15 per cent. *Ad valorem* duties are payable on the c.i.f. value, plus any further expenses up to port of discharge. Duties are payable on the basis of 60 per cent. gold, 40 per cent. paper. The gold milreis is valued at 27d. In addition to the duty there is a 2 per cent. *ad valorem* (gold) tax calculated on the official valuation given to the goods, not on the invoice value.

### Sales and Distribution Methods

British manufacturers of domestic electrical appliances are practically unknown in the market. Only one United Kingdom electrical manufacturer maintains any kind of an active organisation in the country and his products are not for domestic use. On the other hand, foreign firms—particularly American and German—are extremely active. The American firms, moreover, enjoy the co-operation, in many cases, of the public utility companies for reasons already stated.

Having regard to the depression in this market, its low and falling volume of purchasing power, the existing competition and the limited range of articles likely to be in demand, it may be regarded as doubtful whether the outlay necessary to enter the market could prove a reasonable investment. It seems probable, however, that there is an opportunity for working up a business with a selected range of appliances, but this can only be done by the manufacturer himself assuming the initial investment and maintaining a central stock, repair shop and showroom under his own control. Such an establishment would probably pay no profit for several years, but it would certainly pay in the long run, when conditions in the Republic have improved.

---

# The Norwegian Electrical Market

THE Commercial Secretary at the British Legation, Oslo, has prepared for the Department of Overseas Trade a confidential report on the market for electrical contractors' supplies in Norway.

This states that for house installations the sizes of cable most used are the 0.75 to 95 mm². The use of bare leads is not permitted in rooms exposed to damp. The demand for electric cable in Norway is good. In addition to two Norwegian factories, there are a number of German makers competing in the market. It is reported, but not confirmed, that although outwardly firms compete independently with each other, there exists an arrangement between the various cable factories whereby, in the case of all except unimportant orders, the various firms supply the market on the basis of quotas. To this arrangement the Norwegian factories are said to subscribe and their quotas are larger than those of non-Norwegian firms. If this report is correct, it would seem that there is some chance for independent firms to do business. The duty on cable is relatively high, however, and the business to be obtained would be in reality a question of price. The standards for insulated wires and lead cable are said to approximate to the German standards. Conduits were at one time bought in the United Kingdom, but they are now manufactured in Norway. Up to the present, screwed conduit has been used, but there would appear to be a future for grip fittings, which are manufactured in England, if these can be marketed at reasonable prices.

### Class of Material Required

Fuses and fuse boxes are standardised and are made in Norway and Germany, but switch-fuses are not used in Norway.

Electricity is supplied to consumers through current limiters. Meters are at present very rarely used, but the question of changing over from the current limiter method to the meter system is under consideration and there is reason to believe that such a change will ultimately be made.

Porcelain ceiling holders are common and bakelite and other kinds are also popular, but the use of metal holders is restricted, being prohibited in rooms exposed to damp, such as kitchens and bathrooms. Lampholders are of the Edison screw type and are imported from Germany, while switches, both rotary and tumbler, are all made in Germany. Plugs and sockets are generally two-pin, especially in private houses, but three-pin are also used, and in all cases the sockets are of the same diameter. Bakelite has now superseded porcelain in the manufacture of plugs, sockets, and switches, as the latter material is unable to withstand the severe tests to which these articles are now subjected with a view to approval for sale in Norway.

At the present time lamp shades of parchment both plain and decorated, are very popular for use with table and standard lamps, while there is also a demand for glass shades. A large percentage of these are made in Norway, and the largest foreign supplier is Germany. Silk shades for all kinds of lamps, including hanging lamps, were up till recently very popular. Generally, British shades are considered heavy and unsuitable to local taste.

### German Predominance

Formerly, quantities of electrical material were bought from Great Britain and the United States. Germany then commenced to compete in the Norwegian market, with cheap goods of poor quality, and managed to obtain a footing at the expense of British and American makers. Although the standard of efficiency was subsequently raised by the Norwegian authorities, German manufacturers conformed to the requirements and increased their trade. The tests which material must undergo in order to secure approval are very severe and the tendency is always in the direction of increased stringency.

On the whole, there is a gradual increase in the demand for electrical contractors' supplies, and there is no doubt that British manufacturers can participate in the trade to be done, not merely on account of the increasing demand, but also at

the expense of competitors who are already in the market. It should be borne in mind, however, that such trade as British manufacturers may aim at doing ought not to be confined to types of equipment already on the market. The authorities are willing to test for approval all material submitted, and arrangements can be made for material to be submitted for approval by the Commercial Secretary at Oslo and for the replies to be received and transmitted in original to the British manufacturer. If approval for sale is granted, the authorities insist upon the manufacturer being represented by an agent in Oslo.

An appendix to the report gives such details as are available regarding the imports of cables, lamps, and switches, in which it is shown that out of imports of a total value of 4,750,000 kroner, Germany is responsible for no less than 2,366,000 kroner.

A further appendix gives the duties payable on the various classes of electrical material and apparatus.

# East African Prospects

BRITISH electrical goods predominate in British East Africa mainly because the Government and municipal authorities place quality and reliability before price. At the same time a fairly large volume of cheap foreign material enters the territory.

### Kenya

From a D.O.T. report, based on information supplied by the Trade Commissioner at Nairobi, it is learned that in Kenya wiring regulations, put into force in 1925, exist but are undergoing revision. The new rules will stipulate in what circumstances conduit, metal-sheathed wire or c.t.s. wire can be used.

The cables, meters, distribution boards, &c., on the Kenya market are practically all British. Insulated fittings are compulsory in the coastal districts; in up-country districts the demand is mostly for porcelain fittings in the cheap trade and metal fittings where expense is not so important an item. Japanese and German shades have a sale on account of their extreme cheapness. Philips's lamps are virtually supreme in their line.

### Tanganyika

A new Ordnance has been drawn up for Tanganyika and will shortly be applied, to control all electricity supply. Local regulations provide for the testing, registration and issuing of certificates to contractors and wiremen. It is anticipated that the supply system will shortly be standardised at 3-phase, 4-wire 230/400 V. In Tanganyika climatic conditions limit or preclude the use of conduit. The systems usually adopted are in order of favour:—Lead-covered surface wiring, the c.t.s. system and v.i.r. wires on cleats. The wires are mainly British but small quantities of Continental wire are imported by contractors, *via* Zanzibar. The other material used is predominantly British, and Continental makes are losing favour on account of their unreliability. Practically the whole of the glassware trade, however, is in the hands of Japanese manufacturers.

The appointment of active agents, who are salesmen, is recommended. Agents must be supplied on a credit basis with sufficient stocks to meet the demand; they should also be instructed how to use and demonstrate.

A large development is expected within the next four years; it can be felt already although activity is not yet pronounced. Manufacturers of domestic apparatus, hotel equipment, electric signs and fans are advised to see about placing agencies.

### Zanzibar

In Zanzibar there are no regulations in force with regard to electrical installations and all work of importance is executed by the Government Electricity and Wireless Department. It is the policy of the Department to keep in close touch with the contractors and give them advice and assistance with the object of obtaining a good standard of work. The distribution system is 2-wire 220 V d.c. C.t.s. wires are used almost exclusively; the only other system employed is v.i.r. with porcelain cleats.

Fully 90 per cent. of the cables, wires and flexibles are of British manufacture; the other 10 per cent. is divided between Germany and Austria although small quantities of American wire arrive at intervals. Fuse boxes, switchgear, meters, &c., and other items in this category are only used by the Government Electricity Department and are wholly British and to B.E.S.A. specifications. The switchgear employed is iron-clad with switch and fuses combined and the meters are mainly of the electrolytic type, but a limited number of mercury motor meters have been ordered for electric cookers. Although Government imports are wholly British and of high grade, contractors and merchants have imported quite a considerable amount of German, Austrian and American materials of low grade, influenced only by the low prices, without regard to quality, but there is now a steady and definite increase in the importation of British goods due to the policy pursued by the Electricity Department, namely, the use of first-class material only, and also to the gradual reduction in price of British goods. Nearly all fittings and shades imported by contractors and merchants are of German and Austrian manufacture owing to their extremely low prices. Cheap Continental lamps are being imported in varying quantities, but the demand for the more satisfactory standard British lamps is increasing.

Generally speaking, British prices are about 20 per cent. above foreign, but the quality of the foreign goods is very much inferior.

### Import Duties

KENYA AND TANGANYIKA

| | | |
|---|---|---|
| 57L. | Machinery, apparatus, appliances and instruments and electrical material used in connection therewith, for the generation, storage, transmission, distribution of or lighting by electric power and parts thereof, but not including electroliers, lamps, lamp shades or reflectors, portable batteries or electrical appliances for use in connection with vehicles ... ... | Free |
| 72. | Telegraphic and telephonic materials, equipment and instruments for the construction, working and maintenance of telegraph or telephone wires, or for the transmission or reception of wireless, telegraphy or telephony, but not including stationary, or electric batteries suitable for use in motor vehicles ... ... ... | Free |
| 74D. | Steel wire and lead wire n.e.e. ... ... | 10% *ad valorem* |
| 88C. | Glassware, china ware and porcelain ware n.e.e. ... ... ... ... ... | 20% *ad valorem* |
| 174. | Articles not elsewhere mentioned in the tariff ... ... ... ... ... ... | 20% *ad valorem* |

NOTE.—There is levied in Kenya in addition to customs duty a wharfage due of 1 per cent. of the duty paid value.

ZANZIBAR

| | |
|---|---|
| Telegraphic and telephonic construction and equipment requisites ... ... ... | Free |
| Other electrical apparatus and machinery | 15% *ad valorem* |

# Electrical Progress in British Malaya

IN a recent D.O.T. report upon economic conditions in British Malaya (Stationery Office, 2s. net), Mr. R. Boulter, H.M. Trade Commissioner at Singapore, states that the existing depression in the world's manufacturing industries has lessened the demand for rubber and tin, and the extension of this depression to America in the autumn of 1929 has been of exceptionally grave importance, since that country consumes more than half of these materials produced in Malaya.

The returns of foreign trade for 1930 were disappointing, the fall in the value of both exports and imports being very heavy. The Chinese boycott of Japanese goods, which commenced in May, 1928, adversely affected Japanese trade, thereby stimulating trade with the United Kingdom. Great Britain's share of the total Malayan imports was 13.8 per cent.

In 1930 the imports of electrical goods and apparatus had a total value of $5,059,000 (Straits dollars), as compared with $6,908,000 in 1929, the United Kingdom's share being $3,318,000. The principal items were insulated electric wire and cable ($1,520,904), of which the United Kingdom supplied practically the whole quantity ($1,414,785), and electric batteries and accumulators ($1,019,873), of which America is still the largest supplier ($801,084). Of electrical goods and apparatus (except machinery) not specified, of a total of $934,360, imports from the United Kingdom were $790,329. This item includes such articles as electric cookers, water heaters and fans, the trade in which is principally with the United Kingdom.

### Increased Electricity Consumption

Recent years have witnessed considerable developments in the generation and consumption of electricity, and at the end of 1930 the total capacity of plant installed amounted to 116,690 kW. The electrical energy generated in the Federated Malay States in 1930 was 219 million kWh, as against 199 millions in 1929 and 130 millions in 1928. The tin mines are the largest industrial consumers. A feature of the increase in the demand for electricity is that for domestic use, particularly for electric fans, cookers, and bath water heaters. There has also been a rapid increase in the number of refrigerators installed in private houses. During 1930 the capacity of the Bungsar power station of the Electrical Department of the F.M.S. was raised to 19,000 kW, and later in June, 1930, the station of the Perak River Hydro-Electric Power Co., at Chenderoh, which has a capacity of 40,000 h.p., was opened. In the colony there has been a steady expansion in the use of electricity in Singapore. In Penang also the curve of consumption since the opening of the Prai station some nine years ago has risen rapidly.

### Theory of Light

It is reported from Calcutta, India, that Sir Chandrasekhara Venkata Raman, who won the Nobel Prize for Physics this year, announces that he has discovered proof that light consists of particles possessing the additional attribute of angular momentum, which hitherto has been regarded as an uncertain theory. The discovery was made while experimentally scattering light in gases to determine the state of polarisation and molecular spin.

# Parliamentary Notes

**(By our Special Parliamentary Reporter)**

## North Country Prices

On June 23rd MR. LAWTHER asked the Minister of Transport if he would state the cost per kWh for power and lighting respectively, sold by the Newcastle Electric Supply Co., Ltd., the Cleveland and Durham County Electric Power Co., South Shields Corporation, Darlington Corporation, and Sunderland Corporation.

MR. PARKINSON, who replied, said that information showing the cost per kWh of lighting supplies only was not obtainable. The average revenue received per kWh of electricity sold during the year 1929/30 for (*a*) lighting and domestic purposes and (*b*) industrial power purposes respectively was shown in the following table:—

| Undertaker. | Lighting and domestic supplies. Pence per kWh. | Industrial power. Pence per kWh. |
|---|---|---|
| Newcastle-upon-Tyne Electric Supply Co., Ltd. ... ... | 3.01 | 0.52 |
| Cleveland & Durham County Electric Power Co. ... ... | 3.58 | 0.41 |
| South Shields Corporation ... | 3.54 | 0.96 |
| Darlington Corporation ... | 1.71 | 0.52 |
| Sunderland Corporation ... | 2.54 | 0.89 |

## London Passenger Transport

The case for the promoters of the London Passenger Transport Bill has been concluded before the Joint Committee of Lords and Commons which is examining the measure. Sir Leslie Scott, K.C., in putting the case in opposition for the Metropolitan Railway Co., said that his company objected strongly to the application to it of the transfer proposals in the Bill. The company believed that the main line pooling system which had been agreed on was right in its essence, methods and objects, as a means of co-ordinating London passenger transport. If the Committee, in view of the Underground and other settlements, passed the preamble of the Bill to the extent of giving to those settlements statutory effect, while his clients would ask to be excluded from any transfer of ownership, they would ask to be included in the main line pooling scheme. The company believed that it could make its most effective contribution to the common object by going into the main line pool rather than by being absorbed into the proposed London Passenger Transport Board.

Dealing with the various public organisations that had been set up, Counsel said that a port authority had no monopoly in the full sense of the word; it was subject to extreme competition by other ports, and its conditions were different from those of the Board to which the Bill proposed to give complete monopoly. The port authority was not subject to the direct control of a Minister as the Transport Board would be.

The chairman (Lord Lytton) suggested that the case of the Central Electricity Board might be referred to.

Sir Leslie Scott said that under the Electricity Act ownership was excluded except as an ultimate and undesirable necessity in the case of certain contingent defaults. The Central Electricity Board was not an owning Board; it was not even allowed to generate unless there was default on the part of undertakers. It was essentially a piece of machinery for ensuring electricity supply organisation.

# Legal

## Action by the Chloride Electrical Storage Co., Ltd.

IN the Chancery Division on June 25th Mr. Justice Maugham heard an action by the Chloride Electrical Storage Co., Ltd., against the Silvia Wireless Stores, Lambeth, for an injunction restraining the alleged infringement of patent No. 315,556 for "improvements in electric accumulators," by selling below the authorised price. The allegations were denied.

SIR GERALD HURST, K.C., for the plaintiff company, said that the batteries in question were of the "Exide D.T.G." type and the plaintiffs sold them to dealers under a limited licence, their policy being to fix a minimum price which they regarded as an economic one, and, to prevent price-cutting, labels on which the conditions were printed were affixed to the batteries and cartons. This stated that the batteries must not be sold at less than the retail price mentioned in the current price list and that any breach of the conditions would be an infringement and would render the person liable to an action. In August, 1930, in consequence of certain information two of the plaintiffs' employés went to the defendants' stores and purchased one of the batteries at less than the list price but were given a receipt for the full price. Both the battery and the carton bore the label with the restrictive conditions. Evidence was given by the employés in support of the plaintiffs' case.

For the defence, MR. SULLIVAN gave evidence that in August, 1930, he was the sole owner of the business in question. He never sold one of the batteries at less than the list price; he had nothing to do with the sale in question.

His son, MR. P. D. SULLIVAN, said that he acted as manager at the time in question. He gave the receipt and it was untrue that he was paid less than the proper price. A battery shown in the window was not a "D.T.G." but one of an old type. He declared that the alleged conversation with him was an invention.

His Lordship, in giving judgment, said he accepted the evidence of the plaintiffs employés and although he did not think that the defendants had habitually disregarded the law, he believed that at any rate on this occasion someone sold a "D.T.G." battery for less than the proper price and wrote out a receipt for the full amount. Plantiffs were entitled to the injunction for which they asked, with costs.

# West Ham Corporation Bill

WE give below the text of Clause 23 of the West Ham Corporation Bill (relating to a supply of electricity to the L.N.E.R.) which was passed by a Select Committee of the House of Lords, presided over by Lord Lucan.

Sir Lynden Macassey, K.B.E., K.C., for the promoters stated that the power stations of the railway company situated at Stratford and Norton Folgate having come to the end of their commercial life, the company had two courses open to it (1) to re-equip the stations at a cost of £120,000, or (2) to take a bulk supply. On the basis of 8,840,000 kWh per annum for power, excluding traction, but including 380 tenants of the company, West Ham Corporation quoted £23,115 (0.628d. per kWh), which was £1,100 per annum less than the cost to the Railway Company of supplying its own power requirements after expending the capital. The County of London Co. quoted £23,582 plus £4,000 transmission charges, the City of London Co. £26,050 plus £3,000 for transmission, and the North Metropolitan Company £29,726 plus £4,000 for transmission.

Of the total of 10,640,000 kWh required for the railway, 6,100,000 were used in West Ham, 774,000 in Leyton, 50,000 in Walthamstow, 74,000 in the "Northmet" area, 85,000 in Hackney, 12,000 in East Ham, 156,000 in Ilford, 33,000 in Poplar, 513,000 in Stepney, 207,000 in Bethnal Green, 380,000 in Shoreditch, and 1,830,000 in the City of London. (Shoreditch Council has applied for a Special Order with regard to the supply in its own area.)

Mr. J. W. Townley (electrical engineer and manager, West Ham electricity undertaking) denied that the quotation to the railway was a "cut price." He knew of no precedent for the clause but the Corporation supplied the railway and was now seeking additional powers.

Evidence by Mr. H. W. H. Richards, electrical engineer to the L.N.E.R., showed that the cost of taking electricity from each of the undertakers in their respective areas of supply would be £44,460. He said that if the clause were struck out the company would re-equip its own power stations.

Petitions against the Bill were presented by the North Metropolitan Electric Power Supply Co., City of London Electric Lighting Co., and Charing Cross Electricity Supply Co., Hackney Borough Council, and London Power Co.

The clause in question reads as follows:

"23.—(1) Notwithstanding anything contained in any other enactment relating to the Corporation the Corporation may within the Borough supply electricity to the London and North-Eastern Railway Company (in this section referred to as "the Company") for use by the Company subject as hereinafter provided either within or beyond the Borough for any purposes of its undertaking for which it is entitled to use electricity and the Company may use accordingly any electricity so supplied to it. Provided that the Company shall not in any one period of twelve months use for any purposes beyond the Borough more than seventy per centum of the total quantity of electricity supplied to it by the Corporation under the powers of this section in that period, nor shall the Company in the area of supply of any local authority, company, or body authorised to supply electricity, use any electricity supplied to it under this section:—

(*a*) In any building abutting on a public street and erected after the passing of this Bill on lands belonging to or hereafter acquired by the Company (other than a building occupied by the Company for railway purposes), or

(*b*) For supply to the occupier for the time being of any building acquired by the Company after the passing of this Bill in any case where the occupier of the building was at any time within twelve months before such acquisition supplied with electricity by such local authority company or body,

except with the consent of such local authority company or body.

"(2) The Company shall not for the purposes of distributing the electricity supplied to it by the Corporation under the powers of this section, extend its high-voltage distributing cables beyond the existing routes as shown by red lines on the plan signed in triplicate by John Henry Palin, the chairman of the Committee of the House of Commons, to whom the Bill for this Act was referred (of which plan copies have been deposited in the Committee and Private Bill Office of the House of Commons and in the Parliament Office House of Lords and at the Office of the Town Clerk of the Borough).

"(3) Electricity supplied by the Corporation to the Company under the powers of this section shall not be used for purposes of traction or haulage, but nothing in this sub-section shall prevent the use by the Company of electricity so supplied for operating capstans, traversers, or other similar apparatus."

# Correspondence

*Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession*

## Hire Purchase

I have read with much interest Mr. Taunton's article in your issue of the 19th instant on hire-purchase.

I shall not express any opinion on the conflict which Mr. Taunton explains so clearly between the supply authorities and the contractors. I am, however, concerned to remove an erroneous idea to which he gives currency in the latter part of the article.

The contractor is *not* at the disadvantage alleged in the article in comparison with the supply authority in granting hire-purchase terms. The contractor does *not* require to be handicapped by "the expense of organising the collection of the periodical instalments."

The United Dominions Trust (Electric), Ltd., was formed for the express purpose of facilitating the movement and installation of every type of electrical machinery, apparatus or equipment, including the granting of hire-purchase terms by all interested in the development of any branch of the electrical industry. Any sound contractor can avail himself of our facilities, which include the investigation of the credit standing of any potential customer and the regular collection of instalments without any expenditure of either time or money by the contractor himself.

Nor am I sure—though this is a minor point—that "the supply authorities have the enormous advantage that they can enforce payment of instalments as they enforce payment of their quarterly accounts—by the threat of cutting off their service. It is not certain that the threat or the actual cutting-off would be effective in many cases where a threat of legal proceedings would not be equally effective.

My main point is, however, that contractors have only themselves to blame if they are slow to use the facilities which we specifically provide for them.

J. GIBSON JARVIE,
*Chairman*,
United Dominions Trust, Ltd.

London, E.C.2, *June 24th*, 1931.

## All-electric or Oil-electric?

In various quarters an effort is being made to advocate oil-electric locomotives as an alternative to the complete railway electrification programme. In view of the magnitude of the problem, it is particularly important that the claims made for each method of operation should be clearly defined in relation to the different classes of traffic. The ease with which the issue may be confused is illustrated by the following parallel extracts, the first from a speech by the chairman of a company and the second from an advertisement issued by the same company:—

"We believe that the development of this form of motive power is a matter of outstanding interest. It seems to me that consideration of the exceedingly interesting Weir Report on the electrification of the railways lends colour to that view. Full electrification is unquestionably appropriate to dense traffic areas; but on lines of low traffic density we believe that the truest economy lies in the use of Diesel electric rail units, which are vastly cheaper in first cost than electrification and equally cheap to operate. We believe, in fact, that this system will establish itself as ancillary to electrification and effect substantial savings in capital expenditure to the railway companies."

Oil Electrification of Main Line Railways.
The advantages of electrification are obtained at less cost and with greater return on capital.
(*a*) As an adjunct to electrification.
(*b*) As a substitute for electrification.
Mobile units. No special track.
Free from total stoppage.
Immediate return on capital
Consume oil from British coal.
Running costs lower.
No alteration to signalling.

Thus, while the chairman does not claim the oil-electric system as more than ancillary to electrification, the publicity department offers it as a substitute for, as well as an adjunct to, electrification, without any qualifications in respect of traffic density.

Incidentally, it would be useful to know what prospect there is of using oil from British coal on oil-electric sections?

*June 29th*, 1931. PROTONIUS.

## Charges for Industrial Power

In my home I can use as much (or as little) power as I like at a price of ¾d. per kWh, yet in the same town there is a guaranteed industrial annual consumption averaging 1,500,000 kWh going a-begging because the price per kWh asked by the supply company is practically the same as what I am called upon to pay.

Surely a substantial reduction could be made for a load of that size as an inducement to employers to change over to electrical drives for their machines, and I shall be obliged to any of your readers who will explain why such a reduction cannot be made.

I may say that the supply company's high-voltage mains run about 100 yards from the load, and that the prospective consumer is willing to install and maintain the necessary transformer, &c.

*June 20th*, 1931. INQUIRER.

## Electrical "Density"

In your leading article referring to the above, it is rightly claimed that Cardiff's record is better than that of Birmingham with regard to the number of consumers connected in proportion to the population, but in suggesting a basis of five to a household you calculate that 70 per cent. of the inhabitants of Cardiff are enjoying electrical service. I venture to suggest that this basis is wrong. On the same basis Wimbledon with a population of 100,000 and 21,702 consumers at March 31st, 1930, would have had more houses connected than actually existed at that time, whereas, in actual fact, the percentage is only 80 per cent.; as at March 31st, 1930, there were 27,227 buildings and, as I have said, 21,702 consumers. I do not, however, claim this as a record. No doubt other correspondents will be satisfying you on this point.

A. E. MCKENZIE,
*Chief Engineer and Manager*,
Wimbledon, *June 29th*, 1931. Corporation Electricity Dept

## The M.V. "Otaio"

This twin-screw motorship, specially designed for the carriage of refrigerated and general cargo, was built for the New Zealand Shipping Co., Ltd., by Messrs. Vickers-Armstrongs, Ltd., to the designs and under the supervision of Messrs. William Esplen, Son & Swainston, Ltd. The main engines were constructed by Messrs. Wm. Doxford & Sons, Ltd., and practically the whole of the electrical equipment was supplied by the General Electric Co., Ltd. The *Otaio* is 470 ft. long and has a total cargo capacity of about 640,000 cu. ft. The second of the three sister ships is the *Orari*, and the third ship, the *Opawa*, is nearing completion at the yard of Messrs. Alexander Stephens & Sons, Ltd. The electrical machinery in all three ships is practically identical and, whilst each has an economic feature in the form of a steam generating set supplied from Clarkson Diesel exhaust boilers, it is worthy of note that whereas the *Otaio* has a 150-kW reciprocating set, the *Orari* and *Opawa* have 100-kW geared-turbine sets.

The electrical equipment includes the main generators, upwards of 70 motors with their control equipment, main and auxiliary switchboards, &c. In addition, "Osram" lamps are used throughout the ship, a large number of lighting fittings, electric fans, cabin heaters, &c., and the whole of the cable was manufactured at the Pirelli-General Cable Works.

There are three main generating sets, Ruston & Hornsby Diesel engines driving "Witton" generators direct, each having an output of 306 kW at 220 volts and 270 r.p.m. A steam-engine driven auxiliary generator of 150 kW at 450 r.p.m. is also provided. The engine-room and refrigeration pumps are mostly of Drysdale manufacture driven by vertical-spindle motors having double thrust bearings. The electrical deck machinery includes 20 Clarke Chapman winches driven by motors, each developing a normal output of 30 h.p. at 250 r.p.m., the winch load being three tons. To deal with extra heavy loads certain of the winches are arranged to be coupled in pairs and controlled from one master controller. The windlass is of the patent booster-control type; the motor has an output of 60 h.p. at 350 r.p.m., is wound for 390 volts, and connected to the 220-volt supply through the generator end of a motor-driven booster set, the fields of which are so controlled by a reversing potentiometer regulator that the line voltage is boosted, or bucked, to give a variation from 0 to 390 volts.

Special field windings incorporated in the windlass motor and the generator provide for automatic high speeds with light hook and reduced speeds down to a stalled condition on heavy loads; operation is, in fact, practically analogous to a steam-engine drive.

In order to save space and weight in the engine-room the G.E.C. patent plural-starting system has been adopted, which provides a common starting medium for all engine-room and refrigeration-room motors of from 5 to 50 h.p., 24 motors in all. Mounted on the individual motors, in place of the usual terminal box, is a small motor-starting unit containing start and stop push-buttons, ammeter, running pilot light, isolating link, and, in the case of variable speed machines, a shunt regulator. When a machine is up to speed the second line contactor closes, and the starting contactor drops out, thus leaving the motor running at full speed direct on the line, and the starter is then available for use with another machine.

# Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

**1930.**

2,145. "Electric switch devices employed in the ignition circuits of motor vehicles." R. L. R. Nafziger. January 21st, 1930. (349,904.)

2,395. "Constant speed devices." Marconi's Wireless Telegraph Co., Ltd., and H. J. Round. January 23rd, 1930. (349,906.)

2,958. "Electric discharge devices." British Thomson-Houston Co., Ltd. January 28th, 1929. (349,927.)

3,677. "Electric discharge lamps." General Electric Co., Ltd. J. W. Ryde and N. L. Harris. February 3rd, 1930. (349,994.)

4,606. "Electrical relays." British Thomson-Houston Co., Ltd., and R. D. Parry. February 11th, 1930. (350,031.)

5,105. "Light-sensitive cells." L. Kecskemeti-Kaye. November 17th, 1930. (350,032.)

6,132. "Thermionic-valve amplifiers." Igranic Electric Co., Ltd., and L. H. Paddle. February 24th, 1930. (349,929.)

6,195. "Variable electric drives." C. V. Drysdale. February 25th, 1930. (349,930.)

6,752. "Change-over devices for electric or electromagnetic apparatus." R. L. Aspden. February 28th, 1930. (349,935.)

6,847. "Reducers or nipples for electric conduit boxes." G. N. Haden & Sons, Ltd., C. M. Davis, and C. King. March 1st, 1930. (350,004.)

6,905. "Metallic-vapour rectifiers." Akt.-Ges. Brown, Boveri et Cie. March 20th, 1929. (Addition to 279,045.) (350,005.)

7,104. "Automatic isolation of parallel three-phase electric power transmission lines." Victoria Falls & Transvaal Power Co., Ltd. December 21st, 1929. (350,009.)

7,204. "Radio-receiving systems." Standard Telephones and Cables, Ltd. March 14th, 1929. (349,971.)

7,207. "Signal band reduction system." Standard Telephones and Cables, Ltd. C. R. Dunham and A. H. Roche. March 5th, 1930. (349,972.)

7,208. "Time-controlling circuits for telephone or like systems." Standard Telephones & Cables, Ltd., W. Hatton, and K. M. Sano. March 5th, 1930. (349,973.)

7,209. "Supporting means for electron-discharge devices." Standard Telephones & Cables, Ltd. September 9th, 1929. (349,974.)

7,233. "Armature windings for dynamo-electric machines." G. H. Fletcher and Associated Electrical Industries, Ltd. March 5th, 1930. (349,975.)

7,247. "Radio beacons." Marconi's Wireless Telegraph Co., Ltd., J. M. Furnival, and W. F. Bubb. March 5th, 1930. (349,977.)

7,278. "Electrical sealing compositions." Bakelite Corporation. March 6th, 1929. (349,982.)

7,379. "Radio-controlled guide means and method for use in aircraft landing." W. S. Eaton. March 11th, 1929. (350,013.)

7,421. "Wireless and like receiving apparatus." J. Robinson. March 6th, 1930. (Cognate applications 22,498/30 and 29,004/30.) (350,014.)

7,527. "Overhead switch fuses." J. B. Rudkin (Sprecher und Schuh Akt.-Ges.). March 7th, 1930. (350,017.)

7,649. "Power plant." Associated Electrical Industries, Ltd. March 8th, 1929. (350,024.)

7,657. "Electric dimmers. M. Mansell. March 8th, 1930. (350,025.)

7,890. "Appliances for use in massage and electrical treatment of the body." M. Leopold. March 11th, 1930. (350,037.)

7,902. "Adaptors for thermionic valves." Igranic Electric Co., Ltd., and H. V. Gibbons. March 11th, 1930. (350,039.)

7,942. "Selecting and printing mechanism for telegraph receivers." Teletype Corporation. March 20th, 1929. (350,044.)

7,956. "Electric circuit-breakers." A. Reyrolle & Co., Ltd., and J. Mirrey. March 11th, 1930. (350,046.)

8,567. "Introduction of gas into sealed vessels such as those of electric discharge devices." General Electric Co., Ltd., J. W. Ryde, and N. L. Harris. March 17th, 1930. (350,069.)

8,571. "Mercury-vapour rectifiers." Gramophone Co., Ltd., and R. B. Morgan. March 17th, 1930. (350,070.)

8,603. "Electrolytic processes." Birmingham Small Arms Co., Ltd., and S. C. Wilsdon. March 18th, 1930. (350,072.)

8,682. "Photo-electric devices." Kolster-Brandes, Ltd. (Kolster Radio Corporation). March 18th, 1930. (350,075.)

8,807. "Switch-starters for electric motors." W. J. Crampton and J. P. S. Pillans. March 19th, 1930. (350,078.)

8,947. "Method of amplifying electric and other energy." F. Horny (trading as Radiohaus Horny). March 20th, 1930. (350,079.)

9,182. "Means for supporting electric cables." W. T. Henley's Telegraph Works Co., Ltd., and E. Moor. March 22nd, 1930. (350,087.)

9,186. "Means of regulating regeneration in electrically-propelled vehicles." S. S. Guy and W. A. Stevens. March 22nd, 1930. (350,088.)

9,651. "Electrical transformers." Johnson & Phillips, Ltd., and H. M. Lacey. March 26th, 1930. (350,095.)

9,763. "Brakes for tramway vehicles and other rolling stock." Electro-Mechanical Brake Co., Ltd., and G. N. Cadbury. March 27th, 1930. (350,097.)

10,227. "Permanent magnets." Ferranti, Ltd., and H. V. Carlisle. March 31st, 1930. (350,107.)

11,561. "Recording electricity meters." Associated Electrical Industries, Ltd. April 11th, 1929. (350,131.)

11,695. "X-ray tubes." C. H. F. Muller Akt.-Ges. April 19th, 1929. (350,133.)

11,972. "Reception of wireless waves." D. R. MacGregor. April 15th, 1930. (350,139.)

12,224. "Electric motor speed-regulating controllers." H. V. James. April 17th, 1930. (350,144.)

12,596. "High-frequency transmitters." Marconi's Wireless Telegraph Co., Ltd. May 6th, 1929. (350,152.)

12,598. "Picture-telegraph, television and like systems." Marconi's Wireless Telegraph Co., Ltd. May 3rd, 1929. (350,153.)

13,018. "Electron-discharge tubes." Westinghouse Electric and Manufacturing Co. April 27th, 1929. (350,158.)

13,648. "Electric hot-plates and the like." Credenda Conduits Co., Ltd., and P. W. Davis. May 3rd, 1930. (350,172.)

13,890. "Electric motor controllers." Igranic Electric Co., Ltd. (Cutler-Hammer Manufacturing Co.). May 6th, 1930. (350,177.)

14,185. "Alternating-current electrical instruments and electro-magnets therefor." Aron Electricity Meter, Ltd., E. W. Hill, A. White, and E. J. Riordan. May 8th, 1930. (350,185.)

14,452. "Apparatus for damping the oscillations of electric conductors." J. W. Hofmann (trading as J. W. Hofmann (firm of)). February 12th, 1930. (Addition to 332,900.) (350,187.)

14,523. "Wireless-receiving apparatus." Jarrett, Rainsford and Laughton, Ltd., and G. S. Laughton. May 12th, 1930. (350,188.)

15,001. "Motor-car lamps." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. June 22nd, 1929. (350,197.)

15,553. "Incandescent body for electrical incandescent lamps, vacuum tubes, and the like." L. Mellersh-Jackson (Siemens and Halske Akt.-Ges.). May 20th, 1930. (350,204.)

15,599. "Method of and means for obtaining high-tension unidirectional current." Lodge-Cottrell, Ltd., and L. Lodge. May 21st, 1930. (350,205.)

15,987. "Motor-vehicle and like lamps." W. Parry and J. M. Jones. May 24th, 1930. (350,210.)

16,159. "Transformers, inductances, and the like." Igranic Electric Co., Ltd., and H. S. Payman. May 26th, 1930. (350,212.)

16,443. "Electrically-driven mechanism for reciprocating parts such as valves and other devices." Igranic Electric Co., Ltd. (Cutler-Hammer Manufacturing Co.). May 28th, 1930. (350,219.)

17,186. "Electric switches operated by fluid pressure." H. R. Guinot. June 4th, 1930. (350,229.)

17,402. "Devices for locating the direction of wireless signals." M. Anderson. June 5th, 1930. (350,235.)

18,99d. "Thermionic relays." Telefonaktiebolaget L. M. Ericsson. July 5th, 1929. (350,254.)

19,061. "Means for the protection of contact banks on automatic telephones or like selective switches." Coventry Automatic Telephones, Ltd., and C. C. Puckette. June 23rd, 1930. (350,255.)

19,117. "Controllers for direct-current motors." Igranic Electric Co., Ltd. (Cutler-Hammer Manufacturing Co.). June 23rd, 1930. (350,256.)

19,939. "Electric discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. July 18th, 1929. (350,273.)

19,999. "Picture-telegraph and like apparatus." Siemens and Halske Akt.-Ges. July 1st, 1929. (350,274.)

20,484. "Electromagnetic separators." H. H. Thompson, A. E. Davies, and W. E. Box. July 7th, 1930. (350,281.)

20,900. "Arrangements for the automatic filling of receptacles, especially electric accumulators." G. Marconnet. July 11th, 1929. (350,285. )

21,646. "Tramway and railway vehicles." Electro-Mechanical Brake Co., Ltd., and A. W. Kemp. July 17th, 1930. (350,298.)

22,035. "Supporting device for the operative systems of electricity meters." Landis & Gyr Soc. Anon. September 2nd, 1929. (350,303.)

22,266. "Sparking plugs." Fabrica Italiana Magneti Marelli. July 24th, 1929. (350,307.)

22,823. "Winding-control systems." G. R. Shepherd (Westinghouse Electric Manufacturing Co.). July 29th, 1930. (350,313.)

22,843. "Synchronous rectifiers." Crypto Electrical Co., Ltd., and H. G. Sharp. July 29th, 1930. (350,314.)

23,119. "Cellular elements for pressure-responsive devices, particularly applicable to reservoirs for oil-impregnated electric cables." British Thomson-Houston Co., Ltd. July 31st, 1929. (350,317.)

23,574. "Lighting plants for airport landing-places." W. W. Triggs (Ceskomoravska-Kolben-Danek Co., Ltd.). August 6th, 1930. (350,319.)

24,066. "Method of compensating the temperature errors caused by the heating up of the current coils in direct-current watt-hour electricity meters with shunts." Landis & Gyr Soc. Anon. August 17th, 1929. (350,321.)

25,611. "Air-traffic beacon lights." J. Pintsch Akt.-Ges. August 27th, 1929. (350,331.)

28,093. "Electric driving mechanism for high-speed machines." International General Electric Co., Inc. September 19th, 1929. (350,350.)

28,759. "Means for securing the rotor structure to the shaft of self-starting synchronous motors." H. E. Warren. September 25th, 1929. (350,353.)

29,225. "Brush-holders for dynamo-electric machines." Westinghouse Electric & Manufacturing Co. October 11th, 1929. (350,356.)

34,133. "Electric transformer and like tanks." English Electric Co., Ltd., and W. E. M. Ayres. November 13th, 1930. (350,369.)

34,620. "Transmission of pictures." British Thomson-Houston Co., Ltd. November 16th, 1929. (350,371.)

35,935. "Electrical insulators." Hermsdorf-Schomburg-Isolatoren Ges. November 29th, 1929. (Addition to 11,205/30.) (350,373.)

## Large Current-limiting Reactors

Three oil-immersed current-limiting reactors, each of which is said by *Power* to be almost twice as large as any predecessor, were recently built for the Pacific Gas and Electric Company. These reactors, each of which is rated at 5,400 kVA, 300 A, will be used to reduce short-circuit current between two 110,000-volt buses to 3.5 times the normal. Each reactor consists of an air-core coil immersed in a tank of oil protected by nitrogen gas equipment. A laminated-iron magnetic shield protects the tank wall from stray losses due to the strong magnet field. The complete reactor is 8 ft. in diameter, 22 ft. high and weighs more than 36 tons. The outside diameter of the coil is 52 in., and its height, including disk washers, is 96 in.

# New Work for Contractors

## Particulars of new works and building schemes for the use of electrical installation contractors and traders

*Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.*

**Alnwick.**—Police buildings for the Northumberland C.C.; J. G. Green & Sons, builders, Warkworth, Northumberland.

**Ashford** (KENT).—Houses (62) for East Ashford R.D.C.; T. H. Wilde, surveyor, 30, Albemarle Road, Willesborough.

**Barking.**—Houses, Ripple Road; Lord & Mellodew, Ltd.

**Barnard Castle.**—Installation of electric lighting at Public Assistance Institution for Durham County Guardians' Committee.

**Barnet.**—Queen Elizabeth's Grammar School (£42,999); R. Ginn & Son, builders, Hertford.

**Benenden** (KENT).—R.C. church for Mrs. E. M. I. Nichol.

**Bexhill-on-Sea.**—Church, St. Augustine's, Cooden Drive, for St. Barnabus's Church Council; W. H. R. Blacking.

**Billericay** (ESSEX).—Houses (50) for the R.D.C.; H. B. Mayhew, surveyor.

**Billinge** (LANCS.).—Houses (24) for the U.D.C.; surveyor.

**Blackpool.**—Church, Stone Croft Avenue, for St. Mary's Church Council (£6,000); F. T. & H. J. Waddington, architects, 52, Abingdon Street. Reconstruction of premises, 161, Dickson Road, North Shore; F. Wood, borough engineer, Municipal Buildings.

**Blyth.**—Extensions, Louise Road School (£3,359); borough engineer.

**Bolton.**—Rebuilding of premises, Newport Street and Great Moor Street, for T. J. Shannon; Bradshaw, Gass and Hope, architects, 19, Silverwell Street. Arcade of shops, Bridge Street; Townson & Sons, Ltd., builders, Park Hill Street.

**Brentford.**—Washhouses and filtration plant; U.D.C. surveyor. Infants' school (£7,259); W. T. Harris, Hounslow.

**Bristol.**—School, St. Anne's Park, for the city E.C.; A. R. Gough, architect, 24, Bridge Street.

**Carlisle.**—R.C. church, Currock (£5,000) for the Corporation.

**Chatham.**—Business premises, High Street, for Montague Burton, Ltd., Leeds.

**Chesterfield.**—New premises for A. M. Crow & Sons, High Street; P. B. Houfton & Co., architects, Furnival Chambers, Market Place.

**Cirencester.**—Houses (34) for the U.D.C.; Fletcher & Wilkie, builders.

**Coulsdon.**—Garage offices, shop and dwellings, Brighton Road; T. Haywood & Sons. Development, Hooley Farm estate, Guscote, Fowler & Cox.

**Crayford** (KENT).—Houses (53) for the U.D.C.; V. G. Selwood and Co., builders, Chelmsford.

**Denny** (STIRLINGSHIRE).—Houses (64), with electrical work, for the T.C.; J. Strang & Wilson, architects, 39, Vicar Street, Falkirk.

**Derby.**—Improvements to Cottage Hospital, Wirksworth; Chapman & Jenkinson, architects, 18, Norfolk Row, Sheffield. School, Wyndham Street, for the E.C.

**Doncaster.**—Alterations and improvements to the Grand Theatre; Walker & Thompson, architects, Carbon Chambers, Hallgate.

**Durham.**—R.C. school, South Moor; F. A. Coyle, 29, Newmarket Street, and 11, Saville Place, Newcastle-on-Tyne. Extension of Camden Square Council School, Seaham Harbour; F. Willey, architect, 34, Old Elvet.

**Eccles.**—Cinema, Market Place, Bolton (£45,000); P. Hamer, Ltd., builders, Swinton, Manchester.

**Edinburgh.**—R.C. church, Marionville Road (£10,000); priest-in-charge.

**Elland** (YORKS.).—Wesleyan memorial hall; Hinchliffe & Co., architects, Tower Chambers, Silver Street, Halifax.

**Folkestone.**—School, St. Gabriel's, for the borough E.C.; director education.

**Glasgow.**—Houses (672), Possilpark estate; housing director and trade contractors. R.C. church, Riddrie; rector of St. Thomas' R.C. church. Restaurant, Cambridge Street; N. McWhannell, architect, Regent Street. Alterations and improvements, St. Andrew's Hall (£11,404); J. Baxter & Sons. Alterations, various schools (£28,000); director of education.

**High Wycombe.**—Library, art gallery and museum, for the T.C.; borough surveyor.

**Horbury.**—Houses (50), Westfield Road; W. Sugers, engineer and surveyor, Town Hall.

**Hornchurch** (ESSEX).—Houses (32), Harwood Avenue, for Smith & Sharpe. Houses (30), Stafford Avenue, for N. Eyre. Houses (54), Crescent estate, for J. V. Smith.

**Hounslow.**—Cinema (3,000 seats); G. Lilley, contractor, Preston Road, Harrow.

**Irish Free State.**—(WATERFORD).—Houses (44), Rathdaffin, for the Corporation; borough surveyor, 12, The Mall.

**Lanchester** (Co. DURHAM).—Houses (372) for the R.D.C.

**Lincolnshire.**—Secondary school at Skegness (£50,000) for the county E.C.

**Liverpool.**—Store building in Burlington Street for Fairrie and Co. (Tate & Lyle, Ltd.), The Refinery, Vauxhall Road; Hughes & Stirling, builders, 4, Brazenose Road. Extensions, storage accommodation, Long Lane, Aintree, for W. & R. Jacob and Co. (Liverpool), Ltd.; Morrison & Sons, Ltd., builders, Grange Terrace, Wavertree.

**London.**—(BARNES).—Housing scheme, Mortlake; U.D.C. surveyor. (BATTERSEA).—Tenements (39), St. John's College site, for the B.C.; borough surveyor. (BOW).—Additions, Coborn Girls' School, Bow Road; G. Elkington & Son, 7, Laurence Pountney Hill, E.C.4. (CITY OF LONDON).—Improvements to Aldersgate Ward and Packington School; managers. (EALING).—Wesleyan church, Ruislip Road; G. Baines & Son, architects. Sound film studios, Ealing Green, for A.R.P. Studios, Ltd.; R. Atkinson, architect. (FINSBURY).—Public baths and washhouses, Merlin Street (£89,000), for the B.C. (FULHAM).—Enlargement, North End Road School (£15,000); L.C.C. architect. (HACKNEY).—Tenements, Shore estate, for the L.C.C. (£80,457); A. Monk, Lower Edmonton, N. Elementary school, Mount Pleasant Lane (£24,000); L.C.C. architect. (HAMMERSMITH).—Shops, Goldhawk Road; A. Mendelsohn. (LEE).—Houses (52), Coopers Lane and Burnt Ash Hill; W. J. Brise. (LEYTON).—School, Leytonstone (720 places), for the borough E.C.; director of education. (POPLAR).—Bakehouse, St. Leonard's Road; W. T. Lawrence, 12, Tavistock Place, W.C.1. (ST. PANCRAS).—Reconstruction and extension of Town Hall; Special B.C. Committee. (WANDSWORTH).—Municipal buildings (£320,000) for the Metropolitan Borough Council; E. Hunt, architect. (WESTMINSTER).—Shops, Grosvenor housing estate (£7,590); city engineer. (WILLESDEN).—Joint isolation hospital; U.D.C. surveyor. (WOOD GREEN).—Totalisator, Alexandra Park racecourse; J. T. L. Wigmore, Racecourse Betting Control Board, 33, St. James's Street, S.W.1.

**Maidenhead.**—Re-instatement of "Woodhurst," mansion, for E. Dunkels.

**Manchester.**—Bank premises, Oldham Road, Newton Heath; Martin & Stone & Sons, builders, Greenwood Street, Cheshire. Extensions to Holyoake House, Hanover Street, for the Co-operative Union, Ltd.; architects' department, 1, Balloon Street. Alterations and improvement to the Palmerston Hotel, Viaduct Street, Beswick; T. Percival, builder, Varley Street.

**Middlesex.**—Reconstruction of Harefield Sanatorium (£74,500); county architect, Guildhall, Westminster, S.W. Schools, Royal Lane, Hillingdon, and extensions to County School, Ashford (£28,449) for the county E.C.; W. Lacey, Hounslow.

**Neath.**—R.C. school; rector of St. Joseph's.

**Newcastle-on-Tyne.**—Installation of electrical apparatus in 400 houses, Kenton Road housing site; Newcombe & Newcombe, architects, 23, Eldon Square. Houses (54), Wellburn estate; Cussins, Ltd., builders and contractors, St. Mary's Place. Congregational church, Cedar Road; T. Clement & Sons, Ltd., builders, Dene Joinery Works, Selbourne Gardens. Subway running from Post Office Sorting Office to Central Station (£100,000); Post Office authorities. Schools, Byker, Benwell and Wharrier Street, for the E.C. and new printing departing for the C.C.; T. Holford, city architect.

**New Malden** (SURREY).—Church, Wesleyan trustees; Smee and Houchin, architects, Fleet House, Fleet Street, E.C.

**North Riding.**—School, Thornaby-on-Tees (£7,525) for the county E.C.

**Nuneaton.**—Additions and alterations to the Hippodrome Cinema, Bond Street; Meigh & Green, builders, Harefield Road.

**Oldham.**—Houses (198) and extension of the casual wards, Rochdale Road Institution; borough engineer.

**Preston.**—Fire station, St. George's Road, for the T.C..

**Prestwich.**—County branch library; S. Wilkinson, county architect, 16, Ribblesdale Place, Preston.

**Rowley Regis.**—Extensions, senior girls' school, Old Hill; Pritchard, Godwin & Clist, architects, Bank Buildings, Kidderminster.

**St. Helens** (LANCS.).—St. James's Church, Eccleston Park (£10,000); Rev. H. S. Whittaker.

**Seaton Hirst** (NORTHUMBERLAND).—Church; Oliver & Leeson, architects, 14, Ellison Place, Newcastle.

**Sheerness** (KENT).—Houses (38) for the U.D.C.; surveyor.

**Shrewsbury** (SALOP).—Houses (120) for the T.C.; borough surveyor.

**Somerset.**—School, Bridgwater, Milton (Weston-super-Mare), Castle Cary, Chew Magna, Monkton Coombe, Minehead, North Petherton, Stoke St. Michael, and Wells, for the county E.C.; director of education, Weston-super-Mare.

**Southampton.**—Rebuilding and extensions, Above Bar, for Tyrrell & Green, Ltd.

**Spalding.**—Houses (30) for the R.D.C.; W. St. Leger Crowley, architect, 32, Hall Place.

**Stirling.**—Re-erection of Craigforth Mansion for A. J. Couper (£10,000). Foundry department in Laurieston Road School, Falkirk (£2,352), for the county E.C.

**Strood** (KENT).—Electric lighting installation, isolation hospital, Gravesend, for the R.D.C.; J. E. Povey, clerk.

**Sunderland.**—Houses (52), Castletown and Ford, for the R.D.C.; H. Kirton, builders, Seaham, Durham. Alterations and extensions to Highfield Poor Law Institution; Stossard & Sons, builders. Junior technical school (£20,000), West Park, for the E.C.

**Thornton** (LANCS.).—Church; Rev. C. N. Sargeant, vicar.

**Todmorden.**—Cinema; Aspen & Johnson, 104, Manchester Road.

**Wakefield.**—X-ray and therapeutic department for the Building Committee of Clayton Hospital (£12,000); W. H. Watson, architect, Barstow Square.

**Wareham** (DORSET).—Houses (24) for the T.C.; borough surveyor.

**Warrington.**—Houses (119), James Street area; borough engineer.

**West Hartlepool.**—Extensions to business premises, Victoria Street; Tindale & Sons, Ltd., builders, Cumberland Road, Linthorpe.

**West Riding.**—Senior school and caretaker's house, Hoyland Nether Kirk Balk; Education Officer, County Hall, Wakefield.

**Whiston.**—Houses (60), Dunston; surveyor to U.D.C.

**Wiltshire.**—Police station and quarters, Westbury, for the C.C.; T. Walker, architect, Trowbridge.

**Worsborough** (YORKS.).—Houses (84) for the U.D.C.; T. Shield, surveyor.

**Worthing** (SUSSEX).—Clinic (£8,596) for the T.C.; Frank Sandell & Sons, builders.

**Wrexham.**—Extension of institution hospital (£40,000); Denbighshire Public Assistance Committee.

**York.**—Telephone exchange, Acomb, for H.M. Office of Works, King Charles Street, London, S.W.